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TRANSACTIONS

OF THE

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS

VOL. XXVIII

FOR THE YEAR 1915

Edited by E. Gustav Zinke, M.D., F.A.C.S.
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AMERICAN ASSOCIATION OF OBSTETRICIANS AND GYNECOLOGISTS

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NOTE.

The Association does not hold itself responsible for the views enunciated in the papers and discussions published in this volume.

DR. E. GUSTAV ZINKE, *Secretary*,
4 W. Seventh Avenue, Cincinnati

[Minutes and discussions stenographically reported by William Whitford, Chicago, Ill.]

LIST OF ILLUSTRATIONS.

PAGE

Actual Size and Shape of the Gallstone. (RUFUS B. HALL.) 25
Conditions after Removal of Omentum. (BUDD VAN SWERINGEN.) 67
Condition after Removal of Tubes and Ovary. (BUDD VAN SWERINGEN.) . 68
Apparatus for Blood Transfusion. (CHARLES B. SCHILDECKER.) 92
Operation for Chronic Intestinal Stasis. (HAROLD D. MEEKER.) 99–111
Dermoid Cyst with Fatty Concretions. (X. O. WERDER.) 127
Fibroids of Uterus and Dermoid of Right Ovary. (X. O. WERDER.) . . . 128
Carcinoma of Corpus Uteri and Hydrosalpinx. (X. O. WERDER.) 129
Carcinoma of Corpus Uteri with Fibroids. (X. O. WERDER.) 130
Sarcoma of Corpus Uteri with Calcareous Infiltration. (X. O. WERDER.) . 131
Ectopic Gestation of Four and One-half Months. (X. O. WERDER.) . . . 132
Leio-myofibroma. (JOHN NORVAL BELL.) 157
Fibroid Tumor. (O. G. PFAFF.) 167
Chronic Intestinal Stasis. (WILLIAM SEAMAN BAINBRIDGE.) 278–305
Minor Surgical Gynecology. (C. E. RUTH.) 331–337
Morphography of Colons. (JAMES E. DAVIS.) 349–355
Portrait of Walter Blackburn Dorsett, M. D. (FRANCIS REDER.) 402

CONTENTS.

	Page
Constitution	xi
By-Laws	xv
Officers for 1915–1916	xix
List of Officers	xxi
List of Honorary Fellows	xxiii
List of Honorary Fellows, Deceased	xxvii
List of Corresponding Fellows	xxix
List of Senior Fellows	xxxi
List of Ordinary Fellows	xxxiii
List of Ordinary Fellows, Deceased	liii
List of Ordinary Fellows, Classified	lv
Minutes of the Twenty-eighth Annual Meeting	lix
Some Comments on Present Tendencies in Gynecologic and Obstetric Practice. By Chas. L. Bonifield, M. D.	1
Further Experiences with Local Anesthesia in Herniotomy. By J. H. Jacobson, M. D., F. A. C. S.	16
Report of a Case of a Gall-stone Causing Intestinal Obstruction and Volvulus. By Rufus B. Hall, A. M., M. D., F. A. C. S.	24
Cholecystectomy versus Cholecystotomy. By L. W. Swope, M. D., F. A. C. S.	36
Unusual Contents of Inguinal Herniæ, with Report of a Case. By Charles W. Moots, M. D., F. A. C. S.	44
The Surgery of the Appendix. By John W. Keefe, M. D., F. A. C. S., LL. D.	55
A Prognostic Sign in Acute Suppurative Peritonitis. By Hugo O. Pantzer, M. D., F. A. C. S.	60
A Rare Congenital Abnormality of the Sigmoid. By Budd Van Swearingen, M. D.	66
Some Observations upon Postoperative Ureteral Fistulæ. By Henry Dawson Furniss, M. D., F. A. C. S.	70
Mesenteric Thromboses. Report of Two Cases. By Wm. Edgar Darnall, A.M., M. D., F. A. C. S.	81
Remove the Uterus Instead of the Ovaries for Incurable Cases of Menstrual Disorders. By J. H. Carstens, M. D., F. A. C. S.	85
On the Use of Sodium Citrate for Direct Blood Transfusion. By Charles B. Schildecker, M. D., F. A. C. S.	91
Newer Conception of Intestinal Stasis. By George W. Crile, M. D., F. A. C. S.	95
A Contribution to the Conservative Surgery of Chronic Intestinal Stasis. By Harold D. Meeker	98
Gas-pains. By Gordon K. Dickinson, M. D., F. A. C. S.	112
Observations on Malignancy of the Uterus. Demonstration of Specimens. By X. O. Werder, M. D., F. A. C. S.	127
The Use of Luteum Extract in the Treatment of Menstrual Disorders. By Adam P. Leighton, Jr., M. D., L. M. (Dublin)	134
The Present Status of Twilight Sleep in Obstetrics, Based upon a Collective Study of over 2000 Cases. By Abraham J. Rongy, M. D., F. A. C. S.	144
An Unusual Case of Myofibroma, Complicating Pregnancy. By John Norval Bell, M. D., F. A. C. S.	157
Atypical Chorioepithelioma. By Ben R. McClellan, M. D., F. A. C. S.	161
Fibroid Tumor Completely Obstructing Uterine Canal; Dead Fetus Long Retained without Infection. By O. G. Pfaff, M.D.	165

PAGE

The Teaching of Obstetrics. By CHARLES EDWARD ZIEGLER, A. M., M. D., F. A. C. S. 170
The Combined Operation for the Interruption of Pregnancy and Sterilization. By PALMER FINDLEY, M. D., F. A. C. S. 187
Surgical Operations during the Pregnant State. By FRANCIS REDER, M. D., F. A. C. S. 191
The Value of Pituitary Extract in Obstetrics and Gynecology. By SAMUEL W. BANDLER, M. D., F. A. C. S. 202
Menstrual Statistics; a Study Based on 4500 Menstrual Histories. By K. I. SANES, M. D., F. A. C. S. 218
The Principles of Gynecology. By HENRY S. LOTT, M. D. 238
Anesthesia in Gynecological Operations. By R. R. HUGGINS, M. D., F. A. C. S. 247
Colloidal Silver in Sepsis. By G. VAN AMBER BROWN, M. D. 262
Chronic Intestinal Stasis. By WILLIAM SEAMAN BAINBRIDGE, A. M., Sc. D., M. D., C. M. 273
Eclampsia and Its Treatment. By WILLIAM MORTIMER BROWN, M. D. . 308
The Transposition of the Bladder and Uterus for the Cure of Cystocele and Descensus Uteri. By LEWIS F. SMEAD, M. D., F. A. C. S. 315
Wound Dressings. By DOUGLAS H. STEWART, M. D., F. A. C. S. 324
Minor Surgical Gynecology. By C. E. RUTH, M. D., F. A. C. S. 330
Splenic Anemia with Splenectomy. By EDMUND D. CLARK, M. D., F. A. C. S. 342
Morphography of Two Hundred and Eighty-five Colons. By JAMES E. DAVIS, A. M., M. D. 348
A Study of Liver Function in Normal Pregnancy. By JENNINGS C. LITZENBERG, B. S., M. D., F. A. C. S. 392
In Memoriam. Walter Blackburn Dorsett. By FRANCIS REDER, F. A. C. S. 402

CONSTITUTION AND BY-LAWS

OF THE

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS

TOGETHER WITH

MINUTES OF THE TWENTY-EIGHTH ANNUAL MEETING

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS.

CONSTITUTION.

I. The name of this Association shall be THE AMERICAN ASSOCIATION OF OBSTETRICIANS AND GYNECOLOGISTS.

II. Its object shall be the cultivation and promotion of knowledge in whatever relates to Abdominal Surgery, Obstetrics, and Gynecology.

MEMBERS.

III. The members of this Association shall consist of Ordinary Fellows, Honorary Fellows, Corresponding Fellows, and Senior Fellows.

The Ordinary Fellows shall not exceed one hundred and fifty in number.

The Honorary Fellows shall not exceed ten American and twenty-five foreign.

Candidates shall be proposed to the Executive Council at least one month before the first day of meeting, by two Fellows, and shall be balloted for at the annual meeting, a list of names having been sent to every Fellow with the notification of the meeting.

A two-thirds vote in the affirmative of all the members present shall be necessary to elect—fifteen Fellows at least being in attendance.

All candidates for active fellowship shall submit to the Executive Council, at least one month before the annual meeting, an original paper relating to Abdominal Surgery, Obstetrics, or Gynecology.

HONORARY FELLOWS.

IV. The power of nominating Honorary Fellows shall be vested in the Executive Council.

Their election shall take place in the same manner as that of Ordinary Fellows.

They shall enjoy all the privileges of Ordinary Fellows, excepting to vote or hold office, but shall not be required to pay any fee.

CORRESPONDING FELLOWS.

V. The Corresponding Fellows shall be recommended by the Executive Council and elected by the Association.

They shall enjoy all the privileges of Ordinary Fellows, excepting to vote or hold office, and shall be entitled to a copy of the annual TRANSACTIONS.

They shall pay an annual fee of five dollars.

SENIOR FELLOWS.

Senior Fellows shall be nominated by the Executive Council, and elected by the Association as provided for in the election of Honorary Fellows, and they shall enjoy the same privileges as are accorded Corresponding Fellows.

OFFICERS.

VI. The officers of this Association shall be a President, two Vice-Presidents, a Secretary, a Treasurer, and six Executive Councillors.

The nomination of all officers shall be made in open session at the business meeting, and the election shall be by ballot.

The first five officers shall enter upon their duties immediately before the adjournment of the meeting at which they shall be elected, and shall hold office for one year.

"At the election next succeeding the adoption of these laws, the full number of Executive Councillors shall be elected; two for a term of three years, two for a term of two years, and two for a term of one year.

"At every subsequent election two Councillors shall be elected for a term of three years, and shall continue in office until their successors shall have been elected and shall have qualified."[1]

Any vacancy occurring during the recess may be filled temporarily by the Executive Council.

ANNUAL MEETINGS.

VII. The time and place of holding the annual meeting shall

[1] Amendment adopted September 21, 1898.

be determined by the Association or may be committed to the Executive Council each time before adjournment.

It shall continue for three days, unless otherwise ordered by vote of the Association.

AMENDMENTS.

VIII. This Constitution may be amended by a two-thirds vote of all the Fellows present at the annual meeting: *provided*, that notice of the proposed amendment shall have been given in writing at the annual meeting next preceding: and *provided, further*, that such notice shall have been printed in the notification of the meeting at which the vote is to be taken.

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS.

BY-LAWS.

THE PRESIDING OFFICER.

I. The President, or in his absence, one of the Vice-Presidents shall preside at all meetings, and perform such other duties as ordinarily pertain to the Chair.

The presiding officer shall be *ex-officio* chairman of the Executive Council, but shall vote therein only in case of a tie.

SECRETARY.

II. The Secretary shall attend and keep a record of all meetings of the Association and of the Executive Council, of which latter he shall be *ex-officio* clerk, and shall be entitled to vote therein.

He shall collect all moneys due from the members, and shall pay the same over to the Treasurer, taking his receipt therefor.

He shall supervise and conduct all correspondence of the Association; he shall superintend the publication of the TRANSACTIONS under the direction of the Executive Council, and shall perform all the ordinary duties of his office.

He shall be the custodian of the seal, books, and records of the Association.

TREASURER.

III. The Treasurer shall receive all moneys from the Secretary, pay all bills, and render an account thereof at the annual meetings, when an Auditing Committee shall be appointed to examine his accounts and vouchers.

EXECUTIVE COUNCIL.

IV. The Executive Council shall meet as often as the interests of the Association may require. The President, or any three members may call a meeting, and a majority shall constitute a quorum.

It shall have the management of the affairs of the Association, subject to the action of the house at its annual meetings.

It shall have control of the publications of the Association, with full power to accept or reject papers or discussions.

It shall have control of the arrangements for the annual meetings, and shall determine the order of the reading of papers.

It shall constitute a court of inquiry for the investigation of all charges against members for offences involving law or honor; and it shall have the sole power of moving the expulsion of any Fellow.

ORDER OF BUSINESS.

V. The Order of Business at the annual meetings of the Association shall be as follows:

1. General meeting at 10 o'clock A. M.
   - *a*. Reports of Committees on Scientific Questions.
   - *b*. Reading of Papers and Discussion of the same.
2. One business Meeting shall be held at half-past nine o'clock A. M. on the first day of the session, and another on the evening of the second day (unless otherwise ordered by vote), at which only the Fellows of the Association shall be present. At these meetings the Secretary's record shall be read; the Treasurer's Accounts submitted; the reports of Committees on other than scientific subjects offered; and all Miscellaneous Business transacted.

PAPERS.

VI. The titles of all papers to be read at any annual meeting shall be furnished to the Secretary *not later* than one month before the first day of the meeting.

No paper shall be read before the Association that has already been published, or that has been read before any other body.

Not more than thirty minutes shall be occupied in reading any paper before the Association.

Abstracts of all papers read should be furnished to the Secretary at the meeting.

All papers read before the Association shall become its sole property if accepted for publication; and the Executive Council may decline to publish any paper not handed to the Secretary *complete* before the final adjournment of the annual meeting.

QUORUM.

VII. The Fellows present shall constitute a quorum for all business, excepting the admission of new Fellows or acting upon amendments to the Constitution, when not less than fifteen Fellows must be present.

DECORUM.

VIII. No remarks reflecting upon the personal or professional character of any Fellow shall be in order at any meeting, except when introduced by the Executive Council.

FINANCE.

IX. Each Fellow, on admission, shall pay an initiation fee of twenty-five dollars, which shall include his dues for the first year.

Every Fellow shall pay, *in advance* (*i.e.*, at the beginning of each fiscal year) the sum of twenty dollars annually thereafter.

[A fiscal year includes the period of time between the first day of one annual meeting and the first day of the next.]

Any Fellow neglecting to pay his annual dues for two years may forfeit his membership, upon vote of the Executive Council.

The Secretary shall receive, annually, a draft from the President, drawn on the Treasurer, for a sum, to be fixed by the Executive Council, for the services he shall have rendered the Association during the year.

A contingent fund of one hundred dollars shall be placed annually at the disposal of the Secretary for current expenses, to be disbursed by him, and for which he shall present proper vouchers.

ATTENDANCE.

X. Any Fellow who shall neither attend nor present a paper for five consecutive years, unless he offer a satisfactory excuse, shall be dropped from fellowship, upon vote of the Executive Council.

RULES.

XI. *Robert's Rules of Order* shall be accepted as a parliamentary guide in the deliberations of the Association.

AMENDMENTS.

XII. These By-Laws may be amended by a two-thirds vote of the Fellows present at any meeting; *provided*, previous notice in writing shall have been given at the annual meeting next preceding the one at which the vote is to be taken.

OFFICERS FOR 1915–1916

PRESIDENT

HUGO O. PANTZER, Indianapolis

VICE-PRESIDENTS

GORDON K. DICKINSON, Jersey City
ORANGE G. PFAFF, Indianapolis

SECRETARY

E. GUSTAV ZINKE, Cincinnati

TREASURER

HERMAN E. HAYD, Buffalo

EXECUTIVE COUNCIL

X. O. WERDER, Pittsburgh
LOUIS FRANK, Louisville
MILES F. PORTER, Fort Wayne
CHARLES N. SMITH, Toledo
MAGNUS A. TATE, Cincinnati
CHARLES L. BONIFIELD, Cincinnati

LIST OF OFFICERS.

From the Organization to the Present.

	President.	*Vice-Presidents.*	*Secretary.*	*Treasurer.*
1888.	Taylor, Wm. H.	Montgomery, E. E. Carstens, J. H.	Potter, Wm. W.	Werder, X. O.
1889.	Montgomery, E. E.	Myers, W. H. Banta, R. L.	Potter, Wm. W.	Werder, X. O.
1890.	Wright, A. H.	Rohé, G. H. Hall, R. B.	Potter, Wm. W.	Werder, X. O.
1891.	Vander Veer, A.	Hill, H. E. Morris, R. T.	Potter, Wm. W.	Werder, X. O.
1892.	McMurtry, L. S.	Ill, Ed. J. Longyear, H. W.	Potter, Wm. W.	Werder, X. O.
1893.	Rohé, Geo. H.	Manton, W. P. Hulbert, Geo. F.	Potter, Wm. W.	Werder, X. O.
1894.	Carstens, J. H.	Davis, W. E. B. Howitt, H.	Potter, Wm. W.	Werder, X. O.
1895.	Price, Joseph	Cordier, Al. H. Peck, G. S.	Potter, Wm. W.	Werder, X. O.
1896.	Ross, J. F. W.	Johnston, G. B. Sexton, J. C.	Potter, Wm. W.	Werder, X. O.
1897.	Reed, C. A. L.	Douglas, R. Dorsett, W. B.	Potter, Wm. W.	Werder, X. O.
1898.	Ill, Edward J.	Ricketts, Ed. Miller, A. B.	Potter, Wm. W.	Werder, X. O.
1899.	Hall, R. B.	Dunning, L. H. Crofford, T. J.	Potter, Wm. W.	Werder, X. O.
1900.	Davis, W. E. B.	Walker, Ed. Goldspohn, A.	Potter, Wm. W.	Werder, X. O.
1901.	Ricketts, E.	Cumston, C. G. Porter, M. F.	Potter, Wm. W.	Werder, X. O.
1902.	Dunning, L. H.	Rosenwasser, M. Hayd, H. E.	Potter, Wm. W.	Werder, X. O.
1903.	Dorsett, W. B.	Miller, A. B. Haggard, W. D.	Potter, Wm. W.	Werder, X. O.
1904.	Longyear H. W.	Gilliam, D. T. Brown, J. Y.	Potter, Wm. W.	Werder, X. O.
1905.	Brown, J. Y.	West, J. N. Simpson, F. F.	Potter, Wm. W.	Werder, X. O.
1906.	Morris, R. T.	Crile, G. W. Bonifield, C. L.	Potter, Wm. W.	Werder, X. O.
1907.	Zinke, E. G.	Keefe, J. W. Sellman, W. A. B.	Potter, Wm. W.	Werder, X. O.
1908.	Humiston, Wm. H.	Sadlier, J. E. Davis, J. D. S.	Potter, Wm. W.	Werder, X. O.
1909.	Miller, A. B.	Smith, C. N. Huggins, R. R.	Potter, Wm. W.	Werder, X. O.
1910.	Hayd, H. E.	Schwarz, H. Morris, L. C.	Potter, Wm. W.	Werder, X. O
1911.	Werder, X. O.	Frank, L. Tate, M. A.	Zinke, E. G.	Hayd, H. E.
1912.	Porter, M. F.	Smith, C. N. Sadlier, J. E.	Zinke, E. G.	Hayd, H. E.
1913.	Smith, C. N.	Pantzer, H. O. Branham, J. H.	Zinke, E. G.	Hayd, H. E.
1914.	Bonifield, C. L.	Davis, A. B. Sanes, K. I.	Zinke, E. G.	Hayd, H. E.
1915.	Pantzer, H. O.	Dickinson, G. K. Pfaff, O. G.	Zinke, E, G.	Hayd, H. E.

HONORARY FELLOWS.

1899.—Ballantyne, John William, M.D., F.R.C.P.E., F.R.S. Edin. Lecturer on Midwifery and Gynecology, School of Medicine of the Royal Colleges, Surgeons' Hall, Edinburgh; Physician to the Royal Maternity Hospital, Edinburgh; formerly President of the Edinburgh Obstetrical Society; Examiner in Midwifery in the University of Edinburgh; Honorary Fellow of the Glasgow Obstetrical and Gynecological Society. 19 Rothesay Terrace, Edinburgh, Scotland.

1889.—Bantock, George Granville, M.D., F.R.C.S. Ed. Surgeon to the Samaritan Free Hospital. Broad Meadow, King's Norton, Birmingham, England.

1889.—Barbour, Sir A. H. Freeland, M.A., B.S.C., M.D. F.R.C.P. Ed., F.R.S. Ed. Lecturer on Midwifery and Diseases of Women in the Edinburgh Medical School; Assistant Physician to the Royal Maternity Hospital; Assistant Physician for Diseases of Women to the Royal Infirmary; Physician to the Women's Dispensary; Fellow of the Edinburgh and London Obstetrical Societies, and of the British Gynecological Society; Corresponding Fellow of the Royal Academy of Medicine, Turin. 4 Charlotte Square, Edinburgh, Scotland.

1909.—Crofford, Thomas Jefferson, M.D. Rex Arms Apartments, Orange St., Los Angeles, California.

1889.—Croom, Sir J. Halliday, M.D., F.R.C.P.E., F.R.C.S.E., F.R.S.E. Professor of Midwifery in the University of Edinburgh; Consulting Physician to the Royal Infirmary; Physician to the Royal Maternity Hospital; late President of the Royal College of Surgeons, Edinburgh. 25 Charlotte Square, Edinburgh, Scotland.

1891.—Fernandez, Juan Santos, M.D. Prado, No. 105, Havana, Cuba.

1889.—Freund, William Alexander, M.D. Emeritus Professor and Director of the Clinic for Diseases of Women in the University of Strassburg. Kleiststrasse 9, Berlin W., Germany.

1912.—Gilliam, David Tod, M.D. Emeritus Professor of Gynecology, Starling-Ohio Medical College; Gynecologist to St. Anthony Hospital; Member of the American Medical Association, Ohio State Medical Association, Columbus Academy of Medicine; Honorary Member of the Northwestern Ohio Medical Association; Ex-president, Franklin County Medical Society; *Vice-president*, 1905. 333 East State Street, Columbus, Ohio.

1894.—Jacobs, Charles, M.D. Professor of the Faculty of Medicine of Brussels; Secretary-General of the Permanent Committee of the Periodic International Congress of Gynecology and Obstetrics; Honorary President of the Belgian Society of Gynecology and Obstetrics; Honorary Fellow of the Gynecological Societies of New York and Chicago; Member of the Southern Surgical and Gynecological Association; Corresponding Member of the Gynecological Society of Paris; Surgeon to the Brussels Polyclinic. 53 Boulevard de Waterloo, Brussels, Belgium.

1905.—McGraw, Theodore A., M.D. 73 Cass Street, Detroit, Mich.

1890.—Martin, August, M.D. Emeritus Professor of Gynecology in the University of Greifswald. Keithstrasse 14, Berlin W. 62, Germany.

1897.—Mathews, Joseph McDowell, M.D. Professor of Diseases of the Rectum and Clinical Surgery, Hospital College of Medicine; President of the Kentucky State Board of Health; First Vice-President American Medical Association, 1898; President, 1899. 411 The Masonic, Louisville, Kentucky.

1910.—de Ott, Dimitrij Oskarovic. Professor of Obstetrics and Gynecology in the Royal Pavloona Clinical Institute of St. Petersburg; President of the Fifth International Congress of Obstetrics and Gynecology. Wassily Ostrow, University Place, Petrograd, Russia.

1891.—Pietranera, E., M.D. Professor of Obstetrics in the Medical Department of the National University; Director of the Maternity Branch of the Clinical Hospital. 2711 Calle Rio Adaria, Buenos Ayres, Argentine Republic, S. A.

1889.—Schultze, Bernhard Sigmund, M.D. Professor of Gynecology; Director of the Lying-In Institute and of the Gynecological Clinic. 2 Sellierstrasse, Jena, Germany.

1896.—Sternberg, George Miller, A.M., M.D., LL.D. Surgeon General U. S. Army (Retired). 2005 Massachusetts Avenue, Washington, D. C.

1888.—Williams, Sir John, Bart., M.D., F.R.C.P. Blaen Llynant, Aberystwyth, Cardiganshire, Wales.

Total, seventeen Honorary Fellows.

HONORARY FELLOWS, DECEASED.

1892.—Boisliniere, L. Ch., A.B., M.D., L.L.D., Saint Louis, Mo., 1896.

1890.—Championniere, Just. Lucas, M.D., Paris, France, 1913.

1889.—Charpentier, Louis Arthur Alphonse, M.D., Paris, France, 1899.

1888.—Cordes, Auguste E., M.D., Geneva, Switzerland, 1914.

1890.—Corson, Hiram, M.D., Plymouth Meeting, Pa., 1896.

1889.—Dunlap, Alexander, A.M., M.D., Springfield, O., 1894.

1888.—Edis, Arthur Wellesley, M.D., Lond. F.R.C.S., M.R.S.C.S., London, England, 1893.

1889.—Eklund, Abraham Fredrik, M.D., Stockholm, Sweden, 1898.

1891.—Fisher, George Jackson, A.M., M.D., Sing Sing, N. Y., 1893.

1896.—Gaston, James McFadden, A.M., M.D., Atlanta, Ga., 1903.

1892.—Green, Traill, M.D., LL.D., Easton, Pa., 1897.

1889.—Keith, Thomas, M.D., London, England, 1896.

1889.—Leopold, G., M.D., Dresden, Germany, 1913.

1894.—Maclein, Donald, M.D., Detroit, Mich., 1903.

1895.—Mastin, Claudius Henry, M.D., LL.D., Mobile, Ala. 1898.

1891.—Moses, Gratz Ashe, M.D., Saint Louis, Mo., 1901.

1905.—Myers, William Herschel, M.D., Fort Wayne, Ind., 1907.

1889.—Nicolaysen, Julius, M.D., Christiania, Norway, 1915.

1889.—Saenger, Max, M.D., Prague, 1903.

1890.—Savage, Thomas, M.D., F.R.C.S. Eng., Birmingham, England, 1907.

1890—Segond, Paul, M.D., Paris, France, 1913.

1899.—Sinclair, Sir William Japp, A.M., M.D., Manchester, England, 1913.

1894.—Slaviansky, Kronid, M.D., St. Petersburg, Russia, 1898.

1888.—Smith, J. Greig, M.A., C.M., M.B., F.R.S.E., Bristol, England, 1897.

1899.—Storrs, Melancthon, A.M., M.D., Hartford, Conn., 1900.

1888.—Tait, Lawson, M.D., LL.D., F.R.C.S.E., Birmingham, England, 1899.

1905.—Taylor, William Henry, M.D., *President*, 1888–1889, Cincinnati, Ohio, 1910.

1900.—Thornton, J. Knowsley, M.B., M.C., Cambridge, England, 1904.

1901.—Weber, Gustav C. E., M.D., LL.D., Willoughby, Ohio, 1912.

1889.—Von Winckel, F.M.D., Munich, Germany, 1912.

1905.—Wyman, Walter, M.D., Washington, D.C., 1911.

CORRESPONDING FELLOWS.

1899.—Beuttner, Oscar, M.D. Professor of the Faculty of Medicine. 2 Place de la Fasterie, Geneva, Switzerland.

1903.—Crozel, G., M.D. Professor Libre of Gynecology. Collonges au Mont d'Or (Rhone), France.

1914.—Das, Kedarnath, M.D. Professor of Midwifery and Gyneoology, Campbell Medical School; Obstetrician and Gynecologist, Campbell Hospital, Calcutta; Examiner in Midwifery and Gynecology, Calcutta University; Examiner in Midwifery, College of Physicians and Surgeons, Bengal; Fellow, Royal Society of Medicine, London. 22, Bethune Row, Calcutta.

1903.—Ellis, Guilherme, M.D. Chief Surgeon to the Real Sociedade de Beneficencia Portuguese Hospital. 6 Rua Aurora, S. Paulo, Brazil, S. A.

1891.—Griffin, Herbert Spohn, B.A., M B., M.D., C.M. Surgeon to St. Joseph's Hospital; Gynecologist to Hamilton City Hospital; Examiner in Obstetrics, University of Toronto. 157 Main Street, Hamilton, Ontario, Canada.

1914.—Hertoghe, Eugene, M.D. Antwerp, Belgium.

1903.—Lane, Horace Manley, M.D., LL.D. President of Mackenzie College, S. Paulo, Brazil. 184 Rua da Consolacao, S. Paulo, Brazil, S. A.

1891.—Machell, Henry Thomas, M.D., L.R.C.P. Ed. Lecturer on Obstetrics, Women's Medical College; Surgeon to St. John's Hospital for Women; Physician to Victoria Hospital for Sick Children and to Hillcrest Convalescent Home. 95 Bellevue Avenue, Toronto, Ontario, Canada.

1898.—Wright, Adam Henry, B.A., M.D. Univ. Toronto, M.R.C.S., Eng. Professor of Obstetrics in the University of Toronto; Obstetrician and Gynecologist to the Toronto General Hospital and Burnside Lying-in Hospital, *President*, 1891. (Transferred from Ordinary List, 1898.) 30 Gerrard Street, East, Toronto, Ont., Canada.

Total, nine Corresponding Fellows.

SENIOR FELLOWS.

1913.—Blume, Frederick, M.D. Transferred from list of Ordinary Fellows. Gynecologist to the Allegheny General Hospital and Pittsburgh Free Dispensary; Obstetrician to the Roselia Maternity Hospital; Consulting Gynecologist to the Mercy Hospital; President of the Pittsburgh Obstetrical Society, 1892. Office, Jenkins Building, Pittsburgh, Pa.

1911.—Lincoln, Walter Rodman, B.A., M.D. Transferred from list of Ordinary Fellows. Lecturer on Gynecology, College of Physicians and Surgeons of Cleveland. Lennox Building, corner Erie Street and Euclid Avenue, Cleveland, Ohio.

1915.—Lyons, John Alexander, M.D., F.A.C.S. Instructor in Gynecology at the Post-Graduate Medical School; Gynecologist and Lecturer to Nurses at the Chicago Hospital. Residence, 6348 Anthony Avenue; Office, 4118 State Street, Chicago, Ill.

1913.—Stamm, Martin, M.D. Transferred from list of Ordinary Fellows. Professor of Operative and Clinical Surgery in the College of Physicians and Surgeons, Cleveland. 316 Napoleon Street, Fremont, Ohio.

ORDINARY FELLOWS.

1902.—Abrams, Edward Thomas, A.M., M.D., F.A.C.S. Consulting Surgeon to the Lake Superior General Hospital; Member of the Michigan State Medical Society; Member of the American Medical Association. Surgeon to St. Joseph's Hospital. Dollar Bay, Mich.

1895.—Bacon, Joseph Barnes, M.D., F.A.C.S. Professor of Rectal Diseases at the Post-Graduate Medical School; Instructor in Clinical Surgery in the Medical Department of Northwestern University, Chicago. Macomb, Ill.

1911.—Bainbridge, William Seaman, M.D., A.M., M.S., C.M., Sc.D. Adjunct Professor, New York Post-Graduate Medical School, 1902–6; Professor New York Polyclinic Medical School and Hospital since 1906; Surgeon, New York Skin and Cancer Hospital; Attending Surgeon, New York City Children's Hospitals and Schools; Consulting Surgeon, Manhattan State Hospital, New York Home for Dependent Crippled Children, College of Dental and Oral Surgery of New York and Tarrytown Hospital, Tarrytown, N. Y.; Consulting Gynecologist, St. Andrew's Hospital (New York) and St. Mary's Hospital, Jamaica, Long Island and the Ossining Hospital, Ossining, N. Y.; Assistant Surgeon, Medical Reserve Corps, United States Navy; Honorary President International Congress for Study of Tumors and Cancers, Heidelberg, Germany, 1906. 34 Gramercy Place, New York City.

1895.—Baldwin, James Fairchild, A.M., M.D., F.A.C.S. Surgeon to Grant Hospital, 125 South Grant Avenue. Residence, 405 E. Town Street, Columbus, Ohio.

1903.—Bandler, Samuel Wyllis, M.D., F.A.C.S. Instructor in Gynecology in the New York Post-Graduate Medical School and Hospital; Adjunct Gynecologist to the Beth Israel Hospital. 134 West Eighty-seventh Street, New York, N. Y.

1911.—Barrett, Channing W., M.D., F.A.C.S. Gynecologist, Chicago Polyclinic School and Hospital; Professor of Gynecology

and Clinical Gynecology, College of Physicians and Surgeons, Medical Department, University of Illinois; Attending Surgeon and Gynecologist, Marion Sims Sanitarium; Obstetrician, Cook County Hospital. 446 St. James Place, Chicago.

1913.—Baughman, Greer, M.D. Professor of Obstetrics, Medical College of Virginia; Visiting Obstetrician to the Stuart Circle Hospital and to the Memorial Hospital, Richmond, Virginia; Member of the Southern Surgical and Gynecological Association; Vice-President of the Medical Society of Virginia, 1905; Member of the Tri-State Medical Association of Virginia and the Carolinas; Richmond Academy of Medicine and Surgery and the American Medical Society. Residence and Office, 26 North Laurel St., Richmond, Virginia.

1907.—Bell, John Norval, M.D., F.A.C.S. Associate Professor of Obstetrics, Detroit College of Medicine and Surgery; Attending Obstetrician, Harper Hospital; Consultant in Obstetrics, Woman's Hospital. Residence, 203 Pallister Avenue; Office, 1149 David Whitney Bldg., Detroit, Mich.

1914.—Bill, Arthur Holbrook, A.M., M.D. Associate Pro; fessor of Obstetrics, School of Medicine, Western Reserve University-Visiting Obstetrician to the Maternity Hospital of Cleveland; Visiting Obstetrician and Head of the Department, Cleveland City Hospital; Obstetrician in charge of Out-patient Obstetrical Department, Western Reserve University. Residence, 2083 East 96th St.; Office, 1021 Prospect Ave., Cleveland, O.

1900.—Bonifield, Charles Lybrand, M.D. Professor of Gynecology, Medical Department of the University of Cincinnati. Member and Ex-President, Cincinnati Academy of Medicine, Cincinnati Obstetrical Society, Ohio State Medical Association and Ohio Clinical Association. Member of American Medical Association, Southern Surgical and Gynecological Society. *President*, 1914. Residence, 1763 East McMillan Street, Office, 409 Broadway, Cincinnati, Ohio.

1896.—Bosher, Lewis C., M.D., F.A.C.S. Professor of Practice of Surgery and Clinical Surgery, Medical College of Virginia; Visiting Surgeon, Memorial Hospital, Richmond. 422 East Franklin Street, Richmond, Va.

Founder.—Boyd, James Peter, A.M., M.D. Emeritus Professor of Obstetrics and Diseases of Children in the Albany Medical College; Consulting Obstetrician and Gynecologist to the Albany Hos-

pital; Fellow of the British Gynecological Society; Fellow of the Royal Society of Medicine. 152 Washington Avenue, Albany, N. Y.

1889.—Branham, Joseph H., M.D. Professor of Surgery in the Maryland Medical College; Surgeon to the Franklin Square Hospital. 2200 Eutaw Place, corner Ninth Avenue, Baltimore, Md.

1912.—Brown, George Van Amber, M.D. Gynecologist, Cystoscopist, German Polyclinic; Gynecologist, Providence Hospital. Residence, 55 Gladstone Ave.; Office, 919–922 J. Henry Smith Bldg., Cor. Griswold and State Sts., Detroit, Michigan.

1894.—Brown, John Young, M.D., F.A.C.S. Professor of Clinical Surgery in Saint Louis University; Chief Surgeon to St. John's Hospital; President of the Mississippi Valley Medical Association, 1898; *Vice-president*, 1905; *President*, 1906; *Executive Council*, 1907–8. Residence, 303 North Grand Avenue; Office, 612 Metropolitan Building, Saint Louis, Mo.

1914.—Brown, William Mortimer, M.D. Obstetrician to Rochester General Hospital. Residence, 1776 East Ave.; Office, 272 Alexander St., Rochester, N. Y.

1908.—Buteau, Samuel H., M.D., F.A.C.S. Former member of California State Board of Medical Examiners; formerly Visiting Surgeon to Almeda County Hospital. Residence, 1052 Telegraph Avenue; Office, 1155 Broadway, Oakland, Cal.

Founder.—Carstens, J. Henry, M.D., F.A.C.S. Professor Abdominal and Pelvic Surgery, Detroit College of Medicine and Surgery, President of the Faculty. Consulting Gynecologist to the Harper Hospital; Cons. Obstetrician to the Woman's Hospital; Consulting Obstetrician to the House of Providence; Ex-President Michigan State Medical Society; Ex-President Mississippi Valley Medical Society; Ex-Chairman Section of Obstetrics, A. M. A.; Member Royal Society of Medicine; Member American College of Surgeons; etc., etc. President of the Detroit Gynecological Society, 1892. *Vice-president*, 1888–89; *President*, 1895; *Executive Council*, 1896–98. 1447 David Whitney Building, Detroit, Mich.

1914.—Chandler, George, M.D., F.A.C.S. Surgeon to the Kingston City Hospital. Residence and Office, 11 East Chestnut St., Kingston, N. Y.

1915.—Clark, Edmund Dougan, M.D., F.A.C.S. Professor of Surgery and Secretary of the Faculty, Indiana University School of

Medicine. Residence, 1236 New Jersey Street; Office, Hume-Mansur Building, Indianapolis, Ind.

1904.—Congdon, Charles Ellsworth, M.D. Gynecologist to the City Hospital for Women. Office, 859 Humboldt Parkway, Buffalo, N. Y.

1901.—Crile, George W., A.M., M.D., F.A.C.S. Professor of Clinical Surgery in the Western Reserve University Medical College; Surgeon to St. Alexis's Hospital; Associate Surgeon to Lakeside Hospital. *Vice-president*, 1907. Residence, 6203 Euclid Avenue; Office, Osborn Building, Cleveland, Ohio.

1912.—Crotti, Andre, M.D., F.A.C.S. Professor of Clinical Surgery, Ohio State University; Surgeon to Grant Hospital, Children's Hospital and to St. Francis Hospital. Residence, 1728 E. Broad Street; Office, 151 E. Broad Street, Columbus, Ohio.

1905.—Crossen, Harry Sturgeon, M.D., F.A.C.S. Clinical Professor of Gynecology in Washington University; Gynecologist to Washington University Hospital; Associate Gynecologist to Mullanphy Hospital; Consulting Gynecologist to Bethesda, City and Female Hospitals. Residence, 4477 Delmar Avenue; Office, 310 Metropolitan Building, Saint Louis, Mo.

1912.—Darnall, William Edgar, A.B., M.D., F.A.C.S. Gynecologist, Atlantic City Hospital; Consulting Surgeon to North American Children's Sanitarium for the Treatment of Surgical Tuberculosis, and Home for Incurables, Longport, New Jersey. *Vice-president* American Medical Association, 1914. Residence and Office, 1704 Pacific Ave., Atlantic City, N. J.

1911.—Davis, Asa Barnes, M.D., F.A.C.S. Attending Surgeon of the Society of the Lying-in Hospital of the City of New York; Consulting Gynecologist to the Vassar Brother's Hospital, Poughkeepsie, N. Y. 42 E. 35th Street, New York.

1915.—Davis, James Ethelbert, M.D. Attending Surgeon, Providence Hospital, Detroit; Chief of Staff, Salvation Army Maternity Hospital, Detroit; Associate Professor of Surgery, Detroit College of Medicine and Surgery. Residence, 831 West Fort Street; Office, 1229 David Whitney Building, Detroit, Mich.

1903.—Davis, John D. S., M.D., LL.D., F.A.C.S. Professor of Surgery in the Post-Graduate School of Medicine of the University of Alabama; Surgeon to Hillman Hospital; Surgeon to Davis Infirm-

ary; ex-President Jefferson County Medical Society; *Vice-president*, 1905; *Vice-president*, 1909. 2031 Avenue G, Birmingham, Ala.

1896.—Deaver, John Blair, M.D., F.A.C.S. Professor of Clinical Surgery at the University of Pennsylvania; Surgeon in Chief to the German Hospital; Consulting Surgeon to the Germantown Hospital. 1634 Walnut Street, Philadelphia, Pa.

1910.—Dice, William Gordon, A.B., M.D. Obstetrician to Flower Hospital. 240 Michigan Street, Toledo, Ohio.

1909.—Dickinson, Gordon K., M.D., F.A.C.S. Surgeon to the City and Christ Hospitals; Consulting Surgeon to Bayonne Hospital. Consulting Surgeon, Stumpf Memorial Hospital, Kearny, N. J. 280 Montgomery Street, Jersey City, N. J.

1899.—Eastman, Thomas Barker, A.B., M.D., F.A.C.S. Professor of the Medical and Surgical Diseases of Women, Central College of Physicians and Surgeons; Gynecologist to the City Hospital, City Dispensary, and Central Free Dispensary. 309 Pennway Building, Indianapolis, Ind.

1904.—Elbrecht, Oscar H., Ph.B., M.D., F.A.C.S. Formerly Superintendent and Surgeon in Charge, St. Louis Female Hospital; Visiting Surgeon, St. Louis City Hospital; Consulting Gynecologist, Missouri Pacific Hospital; Consulting Surgeon to St. Louis Maternity Hospital and former Chief of Staff; Consulting Surgeon, Bethesda Hospital; Member of Southern Surgical and Gynecological Association. Residence, Buckingham Hotel; Office, 423 Metropolitan Building, St. Louis, Mo.

1906.—Erdmann, John Frederick, M.D., F.A.C.S. Professor of Surgery, N. Y. Post-Graduate Hospital and Medical School; Attending Surgeon to Gouverneur Hospital and Post-Graduate Hospital; Consulting Surgeon to St. John's Riverside Hospital, Yonkers, N. Y.; Mt. Vernon General Hospital, Mt. Vernon, N. Y.; Greenwich General Hospital, Greenwich, Conn.; Nassau Hospital, Mineola, L. I. 60 West Fifty-second Street, New York, N. Y.

1911.—Findley, Palmer, B.E., M.D., F.A.C.S. Professor of Gynecology, College of Medicine, University of Nebraska. 418 Brandeis Theater Building, Omaha, Neb.

1910.—Foster, Curtis Smiley, A.B., M.D., F.A.C.S. Gynecologist to the Western Pennsylvania Hospital, Pittsburgh. Residence, 5749 Ellsworth Avenue; Office, 308 Diamond Bank Building, Pittsburgh, Pa.

1903.—Frank, Louis, M.D., F.A.C.S. Professor of Abdominal and Pelvic Surgery, Medical Department, University of Louisville; Surgeon Louisville City Hospital; Surgeon to John N. Norton Memorial Infirmary; President Mississippi Valley Medical Association, 1912; *Executive Council*, 1913. Residence, 1321 Fourth Ave.; Office, 400 The Atherton, Louisville, Kentucky.

1913.—Freeland, James Roy, M.D., F.A.C.S. Obstetrician to Western Pennsylvania Hospital, Pittsburgh, Pa. Residence and Office, 4715 Fifth Ave., Pittsburgh, Pa.

1912.—Furniss, Henry Dawson, M.D., F.A.C.S. Adjunct Professor of Gynecology, New York Post-Graduate Hospital; Assistant Attending Gynecologist New York Post-Graduate Hospital; Assistant Attending Gynecologist New York Red Cross Hospital; Consulting Cystoscopist, New Rochelle Hospital; Fellow New York Academy of Medicine, New York Medico-Surgical Society, New York Obstetrical Society, New York State and County Medical Societies, American Medical Association, American Urological Society. Residence, 393 West End Ave.; Office, 375 West End Avenue, New York, N. Y.

1902.—Gillette, William J., M.D. Professor of Abdominal Surgery and Gynecology in the Toledo Medical College; Surgeon to Robinwood Hospital. 1613 Jefferson Street, Toledo, Ohio.

1895.—Goldspohn, Albert, M.S., M.D., F.A.C.S. Professor of Gynecology, Post-Graduate Medical School; Surgeon in Chief of Evangelical Deaconess Hospital. *Vice-president*, 1901. Residence, 2118, Office, 2120 Cleveland Avenue, Chicago, Ill.

1912.—Goodman, Sylvester Jacob, Ph.G., M.D., F.A.C.S. Surgeon and Obstetrician Grant Hospital; Lecturer of Obstetrics; Training School for Nurses, Grant Hospital; Consulting Surgeon, Actor's Fund of America, etc., etc. Residence and Office, 238 State Street, Columbus, Ohio.

1913.—Gray, Frank D., M.E.D., M.D., F.A.C.S. Visiting Surgeon to Christ and the City Hospitals, Jersey City; Consulting Surgeon to North Hudson Hospital, Weehawken State Hospital for Insane, Morris Planes, N. J.; State Village for Epileptics, Skillman, N. J.; Fellow, New Jersey State Medical Society; Member, Medico-Surgical Society of New York; Member, Medical Association of the Greater City of New York. Residence and Office, 62 Madison Ave., Jersey City, N. J.

1913.—Hadden, David, B.S., M.D., F.A.C.S. Residence, 2716 Telegraph Ave., Berkeley; Office, Oakland Bank of Savings Bldg., Oakland, Cal.

1900.—Haggard, William David, Jr., M.D., F.A.C.S. Professor of Gynecology, Medical Department University of Tennessee; Professor of Gynecology and Abdominal Surgery, University of the South (Sewanee); Gynecologist to the Nashville City Hospital; President of the Nashville Academy of Medicine; Secretary of the Section on Diseases of Women and Obstetrics, American Medical Association, 1898; Fellow (and Secretary) of the Southern Surgical and Gynecological Association; Member of the Alumni Association of the Woman's Hospital, N. Y. *Vice-president*, 1904. 148 Eighth Avenue, North, Nashville, Tenn.

1906.—Hall, Joseph Arda, M.D., F.A.C.S. Clinical Assistant in Gynecology at the Miami Medical College, Cincinnati. 628 Elm Street, Cincinnati, Ohio.

1889.—Hall, Rufus Bartlett, A.M., M.D., F.A.C.S. Professor of Clinical Gynecology in the Ohio-Miami Medical College, Medical Department of University of Cincinnati; Gynecologist to the Cincinnati Hospital; Surgeon in charge of the Hall Hospital; Member of the British Medical Society; of the Southern Surgical and Gynecological Association; of the American Medical Association; of the Ohio State Medical Society (President, 1900); of the Cincinnati Academy of Medicine (President, 1909); of the Cincinnati Obstetrical Society (Ex-President). *Vice-president*, 1891; *President*, 1900; *Executive Council*, 1904–1909. Berkshire Building, 628 Elm Street, Cincinnati, Ohio.

1902.—Hamilton, Charles Sumner, A.B., M.D., F.A.C.S. Professor of the Principles of Surgery in Sterling Medical College; Surgeon to Mt. Carmel and the Children's Hospitals. 142 South Garfield Street, Columbus, Ohio.

1910.—Harrar, James Aitken, M.D., F.A.C.S. Attending Surgeon to the Lying-in Hospital of the City of New York. Residence and Office, 108 East 64th Street, New York, N. Y.

1894.—Hayd, Herman Emil, M.D., M.R.C.S. Eng., F.A.C.S. Surgeon to the German Deaconess Hospital; Surgeon to the German Hospital. *Vice-president*, 1903; *Executive Council*, 1908–1910; *President*, 1911. 493 Delaware Avenue, Buffalo, N. Y.

1908.—Hedges, Ellis W., A.B., M.D., F.A.C.S. Visiting Surgeon to Muhlenberg Hospital, Plainfield, N. J. 703 Watchung Avenue, Plainfield, N. J.

1910.—Hill, Isadore Leon, A.B., M.D. Clinical Instructor of Obstetrics at Cornell University Medical College; Visiting Obstetrician to the Red Cross Hospital; Attending Obstetrician to Sydenham Hospital. 616 Madison Avenue, New York, N. Y.

1891.—Howitt, Henry, M.D., M.R.C.S. Eng., F.A.C.S. Senior Surgeon to the Guelph General and St. Joseph's Hospitals, Guelph. Member of the British, Canadian and Ontario Medical Associations. President of the Guelph Medical Association. *Vice-president*, 1895. 221 Woolwich St., Guelph, Ontario, Canada.

1905.—Huggins, Raleigh Russell, M.D., F.A.C.S. Surgeon to St. Francis Hospital. *Vice-president*, 1910. 1018 Westinghouse Building, Pittsburgh, Pa.

1895.—Humiston, William Henry, M.D. Clinical Professor of Gynecology in the Medical Department of Western Reserve University; Gynecologist in Chief to St. Vincent's Charity Hospital; Consulting Gynecologist to the City Hospital; President of the Ohio State Medical Society, 1898. *Executive Council*, 1902–1903, 1908, 1910–1911. *President*, 1909. Residence, 2041 East Eighty-ninth Street; Office, 536 Rose Building, Cleveland, Ohio.

1901.—Ill, Charles L., M.D., F.A.C.S. Surgeon to the German Hospital; Assistant Gynecologist to St. Michael's and St. Barnabas's Hospitals; Obstetrician to St. Barnabas's Hospital, Newark; Assistant Gynecologist to All Souls' Hospital, Morristown. 188 Clinton Avenue, Newark, N. J.

Founder.—Ill, Edward Joseph, M.D., F.A.C.S. Surgeon to the Woman's Hospital; Medical Director of St. Michael's Hospital; Gynecologist and Supervising Obstetrician to St. Barnabas's Hospital; Consulting Gynecologist to the German Hospital and the Bnoth Israel Hospital of Newark, N. J., to All Souls' Hospital, Morristown, N. J., and to the Mountain Side Hospital, Montclair, N. J.; Member of the Southern Surgical and Gynecological Association; Vice-president from New Jersey of the Pan-American Medical Congress of 1893; President of the Medical Society of the State of New Jersey, 1907. *Vice-president*, 1893; *President*, 1899; *Executive Council*, 1901–1903. 1002 Broad Street, Newark, N. J.

1909.—Jacobson, Julius H., M.D., F.A.C.S. Professor of Gynecology and Clinical Surgery, Medical Department Toledo University; Surgeon to Lucas City Hospital; Gynecologist to St. Vincent's Hospital, Toledo. 2050 Franklin Street, Toledo, O.

1910.—Jenks, Nathan, B.S., M.D., F.A.C.S. Lecturer on Obstetrics at the Detroit College of Medicine; Visiting Physician to the Woman's Hospital and Infant's Home; Visiting Obstetrician to the New Providence Hospital, Detroit. Residence, 231 Burns Street; Office, David Whitney Building, Detroit, Mich.

1906.—Jonas, Ernst, M.D., F.A.C.S. Clinical Professor of Surgery in Washington University Medical School; Surgeon in Charge of the Surgical Clinic at the Washington University Hospital; Gynecologist to the St. Louis Jewish Hospital; Visiting Surgeon to St. Louis City Hospital; Consulting Surgeon to St. John's Hospital; Surgeon to the Martha Parsons Free Hospital for Children. Residence, 4495 Westminster Place; Office, 465 North Taylor Avenue, St. Louis, Mo.

1910.—Jones, Arthur Thomas, M.D., F.A.C.S. Visiting Gynecologist to St. Joseph's Hospital, Providence; Visiting Surgeon to Memorial Hospital, Pawtucket, R. I.; Visiting Surgeon to Rhode Island State Hospital for the Insane, Howard, R. I.; Consulting Surgeon to Woonsocket Hospital, Woonsocket, R. I. 81 Elm Grove Avenue, Providence, R. I.

1902.—Keefe, John William, M.D., L.L.D., F.A.C.S. Attending Surgeon to the Rhode Island Hospital and Providence City Hospital; Consulting Surgeon to the St. Joseph's Hospital, Providence Lying-In Hospital, Memorial Hospital, Pawtucket and Woonsocket Hospital. *Vice-president*, 1908. *Executive Council*, 1911. 262 Blackstone Boulevarde, Providence, R. I.

1910.—Kennedy, James W., M.D., F.A.C.S. Associate Gynecologist and Obstetrician to the Philadelphia Dispensary. 1409 Spruce Street, Philadelphia, Pa.

1911.—King, James E., M.D., F.A.C.S. Professor of Clinical Gynecology, Medical Department, University of Buffalo, New York; Attending Gynecologist, Buffalo General and Erie County Hospital and Good Samaritan Dispensary; Fellow Royal Society of Medicine, London, England. 1248 Main Street, Buffalo, N. Y.

1908.—Kirchner, Walter C. G., A.B., M.D., F.A.C.S. Formerly Superintendent and Surgeon in charge of the St. Louis City Hospital. Visiting Surgeon City Hospital, Consulting Surgeon St. John's Hospital. Office, Metropolitan Building, St. Louis, Mo.

1898.—Langfitt, William Sterling, M.D., F.A.C.S. Surgeon in chief to St. John's Hospital. Office, 8047 Jenkins Building, Pittsburgh, Pa.

1914.—Leighton, Jr., Adam P., L.M. (Dublin), M.D. Assistant in Gynecology, Bowdoin Medical School; Superintendent and Owner, Dr. Leighton's Maternity Hospital, Portland; Gynecologist to Edward Mason Dispensary, Portland; Member, State Board of Registration of Medicine. Residence and Office, 192 State Street, Portland, Me.

1915.—Litzenberg, Jennings, A.B., M.D., F.A.C.S. Professor of Gynecology and Obstetrics, University of Minnesota. Residence, 3137 Park Avenue; Office, Donaldson Building, Minneapolis, Minn.

1910.—Lobenstine, Ralph Waldo, A.B., M.D., F.A.C.S. Attending Surgeon to the Lying-in Hospital of the City of New York; Gynecologist to Bellevue Hospital Dispensary. Residence, 780 Madison Avenue; Office, 162 East Seventy-first Street, New York, N. Y.

1890.—Longyear, Howard Williams, M.D., F.A.C.S. Professor of Gynecology and Abdominal Surgery in the Detroit Post-Graduate Medical School; Clinical Professor of Gynecology in the Detroit College of Medicine; Gynecologist to Harper Hospital; Physician to the Woman's Hospital; President of the Detroit Gynecological Society, 1889; Chairman of the Section on Obstetrics and Gynecology of the Michigan State Medical Society, 1892. *Vice-president*, 1893; *President*, 1905; *Executive Council*, 1906–1908. 271 Woodward Avenue, Detroit, Mich.

1911.—Lothrop, Earl P., A.B., M.D., F.A.C.S. Gynecologist to the Buffalo Woman's Hospital; Consulting Surgeon to Columbus Hospital, Buffalo; Surgeon to the J. N. Adam Memorial Hospital for Tuberculosis, Perrysburg, N. Y. 153 Delaware Avenue, Buffalo, N. Y.

1910.—Lott, Henry Stokes, M.D. 123 Cherry Street, Winston, N. C.

1913.—Lynch, Jerome Morley, M.D., F.A.C.S. Professor Rectal and Intestinal Diseases, New York Polyclinic; Consulting Surgeon Nassau Hospital, Mineola, L. I.; Attending Surgeon St. Mary's Hospital, Hoboken, N. J.; Member New York State and County Societies, American Medical Association, American Proctologic Society, North Western Medical and Surgical Society; Surgeon Medical Reserve, U. S. N. Residence and Office, 57 East Fifty-second St., New York City.

1910.—McClellan, Benjamin Bush, A.B., A.M., M.D., F.A.C.S. Member American Medical Association; ex-President Ohio State Medical Society; Surgeon to McClellan Hospital. Residence, 636 South Detroit Street; Office, 7 East Second Street, Xenia, Ohio.

Founder.—McMurtry, Lewis Samuel, A.M., M.D., LL.D., F.A.C.S. Professor of Gynecology in the Hospital College of Medicine; Gynecologist to Sts. Mary and Elizabeth Hospital; Fellow of the Edinburgh Obstetrical Society; Fellow of the British Gynecological Society; Corresponding Member of the Obstetrical Society of Philadelphia and of the Gynecological Society of Boston; Member (President, 1891) of the Southern Surgical and Gynecological Association; President American Medical Association, 1905. *Executive Council*, 1891–1892, 1895–1905; *President*, 1893. Suite 542, The Atherton, Louisville, Ky.

1910.—McPherson, Ross, A.B., M.D. Attending Surgeon to the Lying-in Hospital of the City of New York. Residence, 26 Grammercy Park, East; Office. 20 West Fiftieth Street, New York, N. Y.

Founder.—Manton, Walter Porter, M.D., F.A.C.S. Head of Department and Professor of Obstetrics and Clinical Gynecology, Detroit College of Medicine and Surgery; Gynecologist to Harper Hospital and the Pontiac and Traverse City State Hospitals; Consulting Gynecologist to St. Joseph's Retreat; Formerly President of the Medical Board and Visiting Obstetrician Woman's Hospital and Infants' Home; President Detroit Academy of Medicine, 1892–1894; President Detroit Gynecological Society, 1890; President Wayne County Medical Society, 1908–1909; Chairman, Section on Obstetrics and Diseases of Women, 1909; Fellow of the Royal Medical Society, the American Gynecological Society, the American College of Surgeons; the Zoological Society of London, etc. *Vice-president*, 1894. 32 Adams Avenue, W., Detroit, Mich.

1911.—Marvel, Emery, M.D., F.A.C.S. Chief Surgeon and Gynecologist, Private Hospital Association's Atlantic City Consulting Surgeon and Gynecologist, Jewish Seashore Home, Atlantic City, 1801 Pacific Avenue, Atlantic City, N. J.

1914.—Meeker, Harold Denman, A.B., M.D. Adjunct Professor of Surgery, Polyclinic Medical School and Hospital, New York; Visiting Surgeon to New York Red Cross Hospital; Assistant Surgeon, U.S.N., M.R.C. Residence and Office, 220 West 79th Street, New York, N. Y.

Founder.—Miller, Aaron Benjamin, M.D., F.A.C.S. Professor of Gynecology in the Medical Department of Syracuse University; Gynecologist to St. Joseph's Hospital, House of the Good Shepherd and Dispensary. *Vice-president*, 1899, 1904; *President*, 1910; *Executive Council*, 1911. 326 Montgomery Street, Syracuse, N. Y.

1905.—Miller, John D., M.D., F.A.C.S. Assistant to the Chair of Clinical Gynecology in the Medical College of Ohio, University of Cincinnati; Gynecologist to the Good Samaritan Hospital. N. E. Corner Clifton Avenue and W. McMillan Street, Cincinnati, Ohio.

1911.—Moots, Charles W., B.S., M.D., F.A.C.S. Gynecologist to Flower Hospital; President of Academy of Medicine of Toledo and Lucas County, 1912. Residence, River Road, R.F.D. No. 4; Office, 347 The Nicholas, Toledo, Ohio.

1907.—Moriarta, Douglas C., M.D., F.A.C.S. Senior Surgeon to Saratoga Hospital; Surgeon in chief to Saint Christian Hospital for Children; Director of State Experimental Station at Saratoga. 511 Broadway, Saratoga Springs, N. Y.

1904.—Morris, Lewis Coleman, M.D., F.A.C.S. Professor of Gynecology and Abdominal Surgery in the Birmingham Medical College; Secretary, Medical Association State of Alabama, 1904; Member of Jefferson County Board of Health. *Vice-president*, 1911. 1203 Empire Building, Birmingham, Ala.

1890.—Morris, Robert Tuttle, A.M., M.D., F.A.C.S. Professor of Surgery in the New York Post-Graduate Medical School and Hospital. *Vice-president*, 1892; *Executive Council*, 1906, 1908–1911; *President*, 1907. 616 Madison Avenue, New York, N. Y.

1894.—Murphy, John Benjamin, A.M., M.D., LL.D., F.R.C.S. (Eng.), F.A.C.S. Professor of Surgery and Head of the Depart-

ment Northwestern University; Chief Surgeon to Mercy Hospital and St. Joseph's Hospital; Attending Surgeon to Columbus, Alexian Brothers and Cook County Hospitals; President of the American Medical Association, 1911. Residence, 3305 Michigan Avenue; Office, 800 Monroe Building, 104 S. Michigan Avenue, Chicago, Ill.

1896.—Noble, George Henry, M.D. F.A.C.S. Gynecologist to the Grady Hospital; Secretary to the Section on Obstetrics and Gynecology of American Medical Association, 1897; Member of the Southern Surgical and Gynecological Association. 186 South Pryor Street, Atlanta, Ga.

1903.—Noble, Thomas Benjamin, M.D. Professor of Abdominal Surgery in the Central College of Physicians and Surgeons; Consultant in the Diseases of Women at the City Hospital, City Dispensary, and Protestant Deaconess's Hospital, Indianapolis. 427 Newton Claypool Building, Indianapolis, Ind.

1907.—Olmsted, Ingersoll, M.D., F.A.C.S. Surgeon to the City and St. Joseph's Hospitals, Hamilton, Ont. 215 South James St., Hamilton, Ontario, Canada.

1899.—Pantzer, Hugo Otto, M.D., F.A.C.S. Professor of Clinical Gynecology in the Indiana Medical College, Medical Department of Purdue University; Gynecologist to City Hospital, City Dispensary, St. Vincent's and Deaconess's Hospitals; Member of Indianapolis, Indiana State, Ohio Valley, Mississippi Valley, Medical Associations and Indianapolis Gynecological Association. *Executive Council*, 1907–1911. *President*, 1915. 601 Hume-Mansar Bldg., Indianapolis, Ind.

1899.—Pfaff, Orange G., M.D. Adjunct Professor of Obstetrics and Diseases of Women in the Medical College of Indiana; Gynecologist to the City, Deaconess's, and St. Vincent's Hospitals. 1337 North Pennsylvania Street, Indianapolis, Ind.

1898.—Porter, Miles F., M.D., F.A.C.S. Surgeon to Hope Hospital; Professor of Surgery in the Indiana University School of Medicine; ex-President Indiana State Medical Society. *Vice-president*, 1902; *President*, 1912–1913. 207 West Wayne Street, Fort Wayne, Ind.

1914.—Potter, Irving White, M.D. Attending Obstetrician, St. Mary's Maternity Hospital, Assistant Obstetrician, Buffalo General Hospital. Residence and Office, 420 Franklin St., Buffalo, N. Y.

1903.—Poucher, John Wilson, M.D., F.A.C.S. Consulting Surgeon to Vassar Brothers Hospital, Poughkeepsie. 339 Mill Street, Poughkeepsie, N. Y.

1904.—Reder, Francis, M.D., F.A.C.S. Surgeon to Missouri Baptist Sanitarium; Surgeon to St. John's Hospital; Visiting Surgeon to St. Louis City Hospital, and allied Institutions. Residence, 6346 Berlin Avenue; Office, 518–519 Delmar Building, St. Louis, Mo.

Founder.—Reed, Charles Alfred Lee, A.M., M.D., F.A.C.S. Professor of Gynecology and Abdominal Surgery in the Cincinnati College of Medicine and Surgery and in the Woman's Medical College of Cincinnati; Surgeon to the Cincinnati Free Surgical Hospital for Women; Secretary-General of the First Pan-American Medical Congress, 1893; Member of the Southern Surgical and Gynecological Association; Fellow of the British Gynecological Society; President of the American Medical Association, 1901. *Executive Council*, 1890–1897; *President*, 1898. Rooms 60 and 62, The Groton, N. E. corner Seventh and Race Streets, Cincinnati, Ohio.

1913.—Rongy, Abraham Jacob, M.D., F.A.C.S. Attending Gynecologist, Lebanon Hospital; Attending Surgeon, Jewish Maternity Hospital; Consulting Gynecologist, Rockaway Beach Hospital. Residence and Office, 154 Henry Street, New York City.

1909.—Rosenthal, Maurice I., M.D., F.A.C.S. Surgeon to Saint Joseph's Hospital. 336 W. Berry Street, Fort Wayne, Ind.

1902.—Runyan, Joseph Phineas, M.D. Division Surgeon to the Choctaw, Oklahoma and Gulf Railroad; Secretary of the Arkansas State Medical Association, President, 1904. 1514 Schiller Avenue, Little Rock, Ark.

1906.—Ruth, Charles Edward, M.D., F.A.C.S. Professor of Surgery and Clinical Surgery in the Keokuk Medical College (College of Physicians and Surgeons); Surgeon to the Chicago and Rock Island Pacific Railway. Des Moines, Iowa.

1903.—Sadlier, James Edgar, M.D., F.A.C.S. Consulting Surgeon to Highland Hospital, Poughkeepsie. *Vice-president*, 1909. 295 Mill Street, Poughkeepsie, N. Y.

1909.—Sanes, K. Isadore, M.D., F.A.C.S. Gynecologist to the West Penn Hospital; Consulting Gynecologist to the Montefiore

Hospital, Pittsburgh. Residence, 234 McKee Place; Office, Jenkins Building, Pittsburgh, Pa.

1910.—Schildecker, Charles Bushfield, M.D. Assistant Gynecologist to Western Pennsylvania Hospital; Coroner's Physician of Allegheny County. Residence, 414 Rebecca Street; Office, 1105 Park Building, Pittsburgh, Pa.

1904.—Schwarz, Henry, M.D., F.A.C.S. Professor of Obstetrics, Medical Department of Washington University. *Vice-president*, 1911. 440 North Newstead Avenue, St. Louis, Mo.

1901.—Scott, N. Stone, A.M., M.D. Professor of Surgery, College of Physicians and Surgeons, Cleveland; Consulting Surgeon to City Hospital; Consulting Surgeon to St. John's Hospital; Surgeon to the Out-patient Department of Cleveland General Hospital. Residence, 531 Prospect Avenue; Office, 603–604 Citizens' Building, Cleveland, Ohio.

1895.—Sellman, William Alfred Belt, M.D. Gynecologist to The Biedler and Sellman Sanitarium; Member of the Medical and Chirurgical Faculty of Maryland; also of the Baltimore City Medical Society; also of the American Medical Association; the Gynecological and Obstetrical Association of Baltimore; Physician to The Margaret J. Bennett Home for Young Ladies. *Vice-president*, 1908; *Executive Council*, 1909–1910. 5 East Biddle Street, Baltimore, Maryland.

1908.—Sherrill, Joseph Garland, A.M., M.D., F.A.C.S. Professor of Surgery and Clinical Surgery at the University of Louisville. Office, Suite 542, The Atherton, Louisville, Ky.

1899.—Simpson, Frank Farrow, A.B., M.D., F.A.C.S. Gynecologist to the Allegheny General Hospital; Consulting Gynecologist to the Columbia Hospital. *Vice-president*, 1906. Jenkins Building, Pittsburgh, Pa.

1912.—Skeel, Arthur Julius, M.D., F.A.C.S. Assistant Professor of Obstetrics, Western Reserve University; Obstetrician to St. Luke's Hospital; Consulting Obstetrician to the Florence Crittenden Home; Consulting Obstetrician to the Woman's Hospital. Residence and Office, 1834 East 65th Street, Cleveland, Ohio.

1901.—Skeel, Roland Edward, M.D., F.A.C.S. Associate Clinical Professor of Gynecology in Western Reserve University; Gynecologist to St. Luke's, City, and Lutheran Hospitals; Consulting

Surgeon to the Lakewood Hospital. 314 Osborn Building, Cleveland, Ohio.

1910.—Smead, Lewis Frederic, A.B., M.D., F.A.C.S. Surgeon to St. Vincent's Hospital, Toledo. Residence, 2921 Parkwood Avenue; Office, 242 Michigan Street, Toledo, Ohio.

1891.—Smith, Charles North, M.D., F.A.C.S. Surgical Chief of Flower Hospital; Gynecologist to St. Vincent's Hospital; *Vice-president*, 1910. 234 Michigan Street, Toledo, Ohio.

1913.—Smith, Lewis Watson, A.B., M.D. Assistant Gynecologist, Allegheny General Hospital; Gynecologist, Pittsburgh Free Dispensary. Residence and Office, 6024 Station St., Pittsburgh, Pa.

1904.—Smith, William S., M.D. Professor of Gynecology in the Maryland Medical College; Gynecologist to Franklin Square Hospital. 528 Hanover Street, Baltimore, Md.

1902.—Stark, Sigmar, M.D., F.A.C.S. Professor of Obstetrics and Clinical Gynecology in the Cincinnati College of Medicine and Surgery; Gynecologist to the Jewish Hospital. 1108 East McMillan Street, Cincinnati, Ohio.

1908.—Stewart, Douglas Hunt, M.D., F.A.C.S. Surgeon O. P. D. Knickerbocker Hospital. Residence, 128 West 6th Street, New York, N. Y.

1911.—Stillwagen, Charles A., M.D., F.A.C.S. 524 Pennsylvania Avenue, Pittsburgh, Pa.

1914.—Strasser, August Adrian, M.D., F.A.C.S. Surgeon, Stumpf Memorial Hospital, Kearny, N. J.; Assistant Surgeon of the Woman's Hospital, St. Michaels Hospital, Newark, N. J.; Adjunct Surgeon, St. James Hospital, Newark, N. J. Residence and Office, 115 Beech St., Arlington, N. J.

1904.—Sutcliffe, John Asbury, A.M., M.D. Professor of Genitourinary Surgery; Indiana School of Medicine; Consulting Surgeon to St. Vincent's Infirmary; Consultant in Genitourinary Diseases to the City Hospital and to the Protestant Deaconess's Hospital. Residence, 1121 Central Avenue; Office, 155 East Market Street, Indianapolis, Ind.

1899.—Swope, Lorenzo W., M.D., F.A.C.S. Surgeon to the Consolidated Traction Company; Chief Surgeon to Wabash Rail-

road, Pittsburgh Division; Surgeon to Western Pennsylvania Hospital; Surgeon to Passavant Hospital; Member of the Allegheny County Medical Society; Member of the American Medical Association. Residence, 4629 Bayard Street; Office, 1105 Park Building, Pittsburgh, Pa.

1901.—Tate, Magnus Alfred, M.D., F.A.C.S. Professor of Obstetrics Miami Medical College; President Cincinnati Academy of Medicine, 1905. 19 West Seventh Street, Cincinnati, Ohio.

1908.—Torrance, Gaston, M.D. Surgeon to St. Vincent's and the Hillman Hospitals in Birmingham. Residence, 1626 Eleventh Avenue, South; Office, 325 Woodward Building, Birmingham, Ala.

Founder.—Vander Veer, Albert, A.M., M.D., Ph.D., LL.D., F.A.C.S. Five years Professor of Anatomy, Thirty-eight years Professor of Surgery, Albany Medical College; Surgeon-in-Chief, Albany Hospital; Consulting Surgeon, South End Dispensary; Consulting Surgeon, Benedictine Hospital, Kingston, N. Y.; Consulting Surgeon, Champlain Valley Hospital, Plattsburgh, N. Y.; Consulting Surgeon, Crippled and Ruptured Children, West Haverstraw, N. Y.; Fellow of the American Surgical Association (President, 1906); Fellow of the British Gynecological Society; Member of the American Medical Association (First Vice-president, 1915); Member of the Southern Surgical and Gynecological Association; Corresponding Member of the Boston Gynecological Society; Vice-Chancell of the Board of Regents of the Universtity of the State of New York. *Executive Council*, 1889–1891, 1895–1905; *President*, 1892. 28 Eagle Street, Albany, N. Y.

1913.—Vander Veer, Edgar Albert, Ph.D., M.D., F.A.C.S. Attending Surgeon Albany Hospital; Consulting Surgeon, Champlain Valley Hospital, Plattsburgh, N. Y. Residence, 150 State St.; Office, 28 Eagle St., Albany N. Y.

1912.—Van Sweringen, Budd, M.D. 208 Washington Boulevard, Fort Wayne, Indiana.

1909.—Wade, Henry Albert, M.D., F.A.C.S. Visiting Surgeon to Bethany Deaconess's Hospital; Attending Gynecologist to Williamsburg Hospital, Brooklyn. 495 Greene Avenue, Brooklyn, N. Y.

1909.—Waldo, Ralph, M.D., F.A.C.S. Gynecologist to Lebanon Hospital; Associate Surgeon to the Woman's Hospital of the State of New York. 54 W. 71st Street, New York, N. Y.

1891.—Walker, Edwin, M.D., Ph.D., F.A.C.S. Gynecologist to the Evansville City Hospital; President of the Indiana State Medical Society, 1892; Member of the American Medical Association and of the Mississippi Valley Medical Association; Member of the Southern Surgical and Gynecological Association; First Vice-president American Medical Association, 1907. *Vice-president*, 1901. 712 South Fourth Street, Evansville, Ind.

1907.—Weiss, Edward Aloysius, M.D., F.A.C.S. Gynecologist to Mercy Hospital; Gynecologist to Presbyterian Hospital; Obstetrician to Rosalia Maternity Hospital; Assistant Professor of Gynecology at University of Pittsburgh, Medical Department. 714 Jenkins Building, Pittsburgh, Pa.

1914.—Welton, Thurston Scott, M.D. Associate Visiting Gynecologist, Williamsburgh Hospital, Brooklyn; Residence and Office, 842 Union Street, Brooklyn, N. Y.

Founder.—Werder, Xavier Oswald, M.D., F.A.C.S. Professor of Gynecology at the University of Pittsburgh, Medical Department; Gynecologist to Mercy Hospital. *Treasurer*, 1888–1911. *President*, 1911. 714 Jenkins Building, Pittsburgh, Pa.

1904.—West, James Nephew, M.D., F.A.C.S. Professor of Diseases of Women and Secretary of the Faculty at the New York Post-Graduate Medical School and Hospital. *Vice-president*, 1906. 71 West Forty-ninth Street, New York.

1896.—Westmoreland, Willis Foreman, M.D., F.A.C.S. Professor of Surgery at the Atlanta Medical College. Suite 241, Equitable Building, Atlanta, Ga.

1911.—White, George R., B.S., M.D., F.A.C.S. Surgeon Park View Sanitarium. 2 Liberty E., Savannah, Ga.

1909.—Yates, H. Wellington, M.D., F.A.C.S. Gynecologist to St. Mary's Hospital; Gynecologist to Providence Hospital; Assistant Professor of Gynecology, Detroit College of Medicine and Surgery; Member of the Section on Obstetrics, Gynecology and Abdominal Surgery of the American Medical Association; Member of the Staff of St. Luke's Hospital; Member of the Wayne County and Michigan State Medical Society; President Detroit Medical Club; Medical Director of the Peninsular Life Insurance Co. Residence, 1360 Fort Street, West; Office, 607 Gas Office Building, Detroit, Mich.

1907.—Ziegler, Charles Edward, A.M., M.D., F.A.C.S. Professor of Obstetrics in the University of Pittsburgh; Medical Director of the Elizabeth Steele Magee Hospital for Women; Medical Director of the Pittsburgh Maternity Dispensary; Consulting Obstetrician to the Columbia Hospital and Consulting Obstetrician and Gynecologist to the Dixmont Hospital for the Insane. Forbes and Halket Streets, Pittsburgh, Pa.

1900.—Zinke, Ernst Gustav, M.D., F.A.C.S. Professor of Obstetrics and Clinical Midwifery in the Ohio-Miami Medical College, University of Cincinnati, Honorary Chief of Staff and Obstetrician and Gynecologist to the German Hospital; Obstetrician to the Maternity Hospital; President of Cincinnati Obstetric Society, 1887; President Academy of Medicine of Cincinnati 1894; First Vice-president Ohio State Medical Society; Member and Chairman of Section on Obstetrics, Gynecology and Abdominal Surgery, of American Medical Association, 1914; Fellow of Southern Surgical and Gynecological Association. Honorary Member Jackson County Medical Society, Kansas City, Mo. *President*, 1908; *Executive Council*, 1909–1911. *Secretary*, 4 Seventh Avenue, West, Cincinnati, Ohio.

Total, one hundred and thirty-seven Ordinary Fellows.

ORDINARY FELLOWS, DECEASED.

1890.—Asdale, William James, M.D., Beaver Falls, Pa., 1912.

Founder.—Baker, Washington Hopkins, M.D., Philadelphia, Pa., 1904.

1889.—Burns, Bernard, M.D., Allegheny, Pa., 1892.

1890.—Coles, Walter, M.D., St. Louis, Mo., 1892.

1889.—Davis, William Elias B., M.D., Birmingham, Ala., 1903.

1892.—Dorsett, Walter Blackburn, M.D., F.A.C.S., St. Louis, Mo., 1915.

1892.—Duff, John Milton, A.M., M.D., Ph.D., Pittsburg, Pa., 1904.

1898.—Dunn, James C., M.D., Pittsburg, Pa., 1907.

1892.—Dunning, Lehman Herbert, M.D., Indianapolis, Ind., 1906.

1895.—Ferguson, Alexander Hugh, M.D., Chicago, Ill., 1911.

1890.—Frederick, Carlton Cassius, B.S., M.D., Buffalo, N.Y., 1911.

1891.—Gibbons, Henry, Jr., A.M., M.D., San Francisco, Cal., 1912.

1904.—Goodfellow, George E., M.D., Los Angeles, Cal., 1910.

1892.—Haggard, William David, Jr., M.D., Nashville, Tenn., 1901.

Founder.—Hill, Hampton Eugene, M.D., Saco, Me., 1894.

1912.—Hotaling, Albert Steuben, M.D., Syracuse, N. Y., 1913.

1898.—Hyde, Joel W., M.D., Brooklyn, N. Y., 1907.

1897.—Ingraham, Henry Downer, M.D., Buffalo, N. Y., 1904.

Founder.—Jarvis, George Cyprian, M.D., Hartford, Conn., 1900.

1892.—Jelks, James Thomas, M.D., Hot Springs, Ark., 1902.

1900.—Linville, Montgomery, A.B., M.D., New Castle, Pa., 1910.

Founder.—Lothrop, Thomas, M.D., Buffalo, N. Y., 1902.

1891.—McCann, James, M.D., Pittsburgh, Pa., 1893.

1898.—McCann, Thomas, M.D., Pittsburgh, Pa., 1903.

1896.—Mooney, Fletcher D., M.D., St. Louis, Mo., 1897.

Founder.—Potter, William Warren, M.D., Buffalo, N. Y., 1911.

Founder.—Price, Joseph, M.D., Philadelphia, Pa., 1911.

1896.—Rhett, Robert Barnwell, Jr., M.D., Charleston, S. C., 1901.

1889.—Rohe, George Henry, M.D., Baltimore, Md., 1899.

1892.—Rosenwasser, Marcus, M.D., Cleveland, O., 1910.

1890.—Ross, James Frederick Wm., M.D., C.M., L.R.C.P., Toronto, Ontario, Canada, 1911.

1889.—Seymour, William Wotkyns, A.B., M.D., Troy, N. Y., 1904.

1902.—Simons, Manning, M.D., Charleston, S. C., 1911.

Founder.—Townsend, Franklin, A.M., M.D., Albany, N. Y., 1895.

1907.—Vance, Ap Morgan, M.D., F.A.C.S., Louisville, Ky., 1915.

ORDINARY FELLOWS.

Classified.

ALABAMA.

Davis, John D. S.,	2031 Avenue G.,	Birmingham.
Morris, Lewis Coleman,	1203 Empire Bldg.,	Birmingham.
Torrance, Gaston,	325 Woodward Bldg.,	Birmingham.

ARKANSAS.

Runyan, Joseph Phineas,	1514 Schiller Ave.,	Little Rock.

CALIFORNIA.

Buteau, Samuel H.,	1155 Broadway,	Oakland.
Hadden, David,	Oakland Bank of Savings Bldg.,	Oakland.

CANADA.

Howitt, Henry,	221 Woolwich Street,	Guelph, Ontario.
Olmsted, Ingersoll,	215 South James St.,	Hamilton, Ontario.

GEORGIA.

Noble, George Henry,	186 South Pryor Street,	Atlanta.
Westmoreland, W. F.,	241 Equitable Bldg.,	Atlanta.
Whitem, George R.,	2 Liberty E.,	Savannah.

ILLINOIS.

Bacon, Joseph Barnes,		Macomb.
Barrett, Channing,	446 St. James Place,	Chicago.
Goldspohn, Albert,	34 Washington St.,	Chicago.
Lyons, John A.,	4118 State Street,	Chicago.
Murphy, John B.,	400 Reliance Bldg.,	Chicago.

INDIANA.

Walker, Edwin,	712 South Fourth St.,	Evansville.
Porter, Miles F.,	207 West Wayne St.,	Fort Wayne.
Rosenthal, M. I.,	336 West Berry St.,	Fort Wayne.
Van Sweringen, Budd,	208 Washington Blvd.,	Fort Wayne.
Clark, Edmund D.,	Hume Mansur Bldg.,	Indianapolis.
Eastman, Thomas B.,	309 Pennway Bldg.,	Indianapolis.
Noble, Thomas B.,	427 Newton Claypool Bldg.,	Indianapolis.
Pantzer, Hugo O.,	224 North Meridian St.,	Indianapolis.
Pfaff, O. G.,	1337 North Pennsylvania St.,	Indianapolis.
Sutcliffe, John A.,	155 East Market St.,	Indianapolis.

IOWA.

Ruth, Charles E.,	407 Equitable Bldg.,	Des Moines.

KENTUCKY.

Frank, Louis,	The Atherton,	Louisville.
McMurtry, Lewis S.,	The Atherton,	Louisville.
Sherrill, Joseph G.,	The Atherton,	Louisville.

MAINE.

Leighton, Adam P.,	192 State St.,	Portland.

MARYLAND.

Branham, Joseph H.,	2200 Eutaw Place,	Baltimore.
Sellman, William A. B.,	5 East Biddle St.,	Baltimore.
Smith, William S.,	528 Hanover St.,	Baltimore.

MICHIGAN.

Abrams, Edward Thomas,		Dollar Bay.
Bell, John Norval,	506 Washington Arcade,	Detroit.
Brown, Geo. Van Amber,	32 Adams Ave., West,	Detroit.
Carstens, J. Henry,	620 Woodward Ave.,	Detroit.
Davis, James E.,	821 West Fort St.,	Detroit.
Jenks, Nathan,	271 Woodward Ave.,	Detroit.
Longyear, H. W.,	271 Woodward Ave.,	Detroit.
Manton, Walter P.,	32 Adams Ave., West,	Detroit.
Yates, H. Wellington,	1360 Fort Street,	Detroit.

MINNESOTA.

Litzenberg, Jennings C.,	Donaldson Bldg.,	Minneapolis.

MISSOURI.

Brown, John Young,	612 Metropolitan Bldg.,	Saint Louis.
Crossen, H. S.,	Metropolitan Bldg.,	Saint Louis.
Elbrecht, Oscar H.,	Metropolitan Bldg.,	Saint Louis.
Jonas, Ernst,	465 North Taylor Ave.,	Saint Louis.
Kirchner, Walter C. G.,	Metropolitan Bldg.,	Saint Louis.
Reder, Francis,	6346 Berlin Ave.,	Saint Louis.
Schwarz, Henry,	440 North Newstead Ave.,	Saint Louis.

NEBRASKA.

Findley, Palmer,	418 Brandeis Theater Bldg.,	Omaha.

NEW JERSEY.

Strasser, August A.,	115 Beech St.,	Arlington.
Darnall, Wm. Edgar,	1704 Pacific Ave.,	Atlantic City.
Marvel, Emery,	1801 Pacific Ave.,	Atlantic City.
Dickinson, Gordon K.,	286 Montgomery St.,	Jersey City.
Gray, Frank D.,	62 Madison Ave.,	Jersey City.
Ill, Charles L.,	188 Clinton Ave.,	Newark.
Ill, Edward J.,	1002 Broad St.,	Newark.
Hedges, Ellis W.,	703 Watchung Ave.,	Plainfield.

NEW YORK.

Boyd, James P.,	152 Washington Ave.,	Albany.
Vander Veer, Albert,	28 Eagle Street,	Albany.
Vander Veer, Edgar A.,	150 State St.,	Albany.
Wade, Henry A.,	495 Greene Ave.,	Brooklyn.
Welton, T. Scott,	842 Union St.,	Brooklyn.
Congdon, Chas. E.,	859 Humboldt Parkway,	Buffalo.
Hayd, H. E.,	493 Delaware Ave.,	Buffalo.
King, James E.,	1248 Main St.,	Buffalo.
Lothrop, Earl P.,	153 Delaware Ave.,	Buffalo.
Potter, Irving W.,	420 Franklin St.,	Buffalo.
Chandler, George,	11 East Chestnut St.,	Kingston.
Bainbridge, W. S.,	34 Grammercy Place,	New York.
Bandler, S. W.,	134 West Eighty-seventh St.,	New York.
Davis, Asa B.,	42 East 35th St.,	New York.
Erdmann, John F.,	60 West Fifty-Second St.,	New York.
Furniss, Harry Dawson,	393 West End Ave.,	New York.
Harrar, James A.,	29 East Seventy-seventh St.,	New York.
Hill, I. L.,	616 Madison Ave.,	New York.
Lynch, Jerome Morley,	57 East 52nd St.,	New York.
Lobenstine, R. W.,	155 East Seventieth St.,	New York.
McPherson, Ross A.,	20 West Fiftieth St.,	New York.
Meeker, Harold D.,	220 West 79th St.,	New York.
Morris, R. T.,	616 Madison Ave.,	New York.
Rongy, Abraham J.,	154 Henry St.,	New York.
Stewart, Douglas H.,	128 West 86th St.,	New York.
Waldo, Ralph,	54 West 71st St.,	New York.
West, James N.,	71 West Forty-ninth St.,	New York.
Moriarta, Douglas C.,	511 Broadway,	Saratoga Springs.
Sadlier, James E.,	295 Mill St.,	Poughkeepsie.
Poucher, John W.,	339 Mill St.,	Poughkeepsie.
Miller, A. B.,	326 Montgomery St.,	Syracuse.

NORTH CAROLINA.

Lott, Henry Stokes,	123 Cherry St.,	Winston.

OHIO.

Bonifield, Chas. L.,	409 Broadway,	Cincinnati.
Hall, Joseph A.,	628 Elm St.,	Cincinnati.
Hall, Rufus B.,	628 Elm St.,	Cincinnati.
Miller, John D.,	N. E. Cor. Clifton & McMillan,	Cincinnati.
Reed, C. A. L.,	The Groton,	Cincinnati.
Stark, Sigmar,	1108 East McMillan St.,	Cincinnati.
Tate, Magnus A.,	19 West Seventh St.,	Cincinnati.
Zinke, E. Gustav,	4 West Seventh St.,	Cincinnati.
Crile, George W.,	Osborn Bldg.,	Cleveland.
Humiston, William H.,	536 Rose Bldg.,	Cleveland.
Lincoln, Walter R.,	Lennox Bldg.,	Cleveland.
Scott, N. Stone,	603 Citizens Bldg.,	Cleveland.

Skeel, Arthur,	1834 East 65th St.,	Cleveland.
Skeel, Roland Edward,	314 Osborn Bldg.,	Cleveland.
Baldwin, James F.,	405 East Town St.,	Columbus.
Crotti, André,	1728 East Broad St.,	Columbus.
Goodman, Sylvester J.,	238 State St.,	Columbus.
Hamilton, Chas. S.,	142 South Garfield St.,	Columbus.
Stamm, Martin,	316 Napoleon St.,	Fremont.
Dice, Wm. Gordon,	240 Michigan St.,	Toledo.
Gillette, Wm. J.,	1613 Jefferson St.,	Toledo.
Jacobson, Julius H.,	2050 Franklin St.,	Toledo.
Moots, Chas. W.,	The Nicholas,	Toledo.
Smead, Lewis F.,	242 Michigan St.,	Toledo.
Smith, Chas. N.,	234 Michigan St.,	Toledo.
McClellan, Benjamin B.,	7 East Second St.,	Xenia.

PENNSYLVANIA.

Kennedy, James W.,	1409 Spruce St.,	Philadelphia.
Blume, Frederick,	Jenkins Bldg.,	Pittsburg.
Foster, Curtis S.,	308 Diamond Bank Bldg.	Pittsburg.
Freeland, James R.,	4715 Fifth Ave.,	Pittsburg.
Huggins, R. R.,	1018 Westinghouse Bldg.,	Pittsburg.
Langfitt, William S.,	Jenkins Bldg.,	Pittsburg.
Sanes, K. I.,	Park Bldg.,	Pittsburg.
Schildecker, Charles B.,	1105 Park Bldg.,	Pittsburg.
Simpson, Frank F.,	Jenkins Bldg.,	Pittsburg.
Smith, Louis Watson,	1624 Station St.,	Pittsburg.
Stillwagen, Charles A.,	524 Pennsylvania Ave.,	Pittsburg.
Swope, Lorenzo W.,	1105 Park Bldg.,	Pittsburg.
Weiss, Edward A.,	714 Jenkins Bldg.,	Pittsburg.
Werder, Xavier O.,	Jenkins Bldg.,	Pittsburg.
Ziegler, Chas. E.,	354 South Highland Ave.,	Pittsburg.

RHODE ISLAND.

Jones, Arthur T.,	81 Elm Grove Ave.,	Providence.
Keefe, John W.,	259 Benefit St.,	Providence.

TENNESSEE.

Haggard, William D.,	148 Eighth Ave., North,	Nashville.

VIRGINIA.

Baughman, Greer,	26 North Laurel St.,	Richmond.
Bosher, Lewis C.,	422 East Franklin St.,	Richmond.

MINUTES OF THE PROCEEDINGS

AT THE

TWENTY-SEVENTH ANNUAL MEETING

OF THE

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS

HELD AT

HOTEL SCHENLEY

PITTSBURGH, PA.

SEPTEMBER 14, 15, AND 16, 1915

TWENTY-EIGHTH ANNUAL MEETING.

SEPTEMBER 14, 15, and 16, 1915.

The following-named Fellows were present:

BANDLER, SAMUEL W., ... NEW YORK, N. Y.
BAUGHMAN, GREER,. . . . . RICHMOND, VA.
BELL, JOHN NORVAL, ... DETROIT, MICH.
BILL, ARTHUR H., ... CLEVELAND, O.
BLUME, FREDERICK, ... PITTSBURGH, PA.
BONIFIELD, CHARLES L., ... CINCINNATI, O.
BROWN, GEORGE VAN AMBER, . . . DETROIT, MICH.
BROWN, WM. MORTIMER,. . . . . ROCHESTER, N. Y.
CARSTENS, J. HENRY, ... DETROIT, MICH.
CHANDLER, GEORGE, ... KINGSTON, N. Y.
CLARK, EDMUND D., ... INDIANAPOLIS, IND.
CRILE, GEORGE W., ... CLEVELAND, O.
DARNALL, WM. EDGAR, ... ATLANTIC CITY, N. J.
DAVIS, ASA BARNES,. . . . . NEW YORK CITY.
DAVIS, JAMES E., ... DETROIT, MICH.
DICE, WM. G., ... TOLEDO, OHIO.
DICKINSON, GORDON K., ... JERSEY CITY, N. J.
EASTMAN, THOMAS B., ... INDIANAPOLIS, IND.
ELBRECHT, OSCAR H.,. . . . . ST. LOUIS, MO.
ERDMANN, JOHN F.,. . . . . NEW YORK CITY.
FINDLEY, PALMER, ... OMAHA, NEB.
FOSTER, CURTIS S., ... PITTSBURGH, PA.
FREELAND, JAMES R.,. . . . . PITTSBURGH, PA.
FURNISS, HENRY D.,. . . . . NEW YORK CITY.
GILLIAM, DAVID TOD,. . . . . COLUMBUS, OHIO.
GOODMAN, SYLVESTER J.,. . . . . COLUMBUS, OHIO.
GRAY, FRANK DELOS, ... JERSEY CITY, N. J.
HALL, RUFUS B., ... CINCINNATI, OHIO.
HAYD, HERMAN E., ... BUFFALO, N. Y.
HUGGINS, R. R., ... PITTSBURGH, PA.
HUMISTON, WM. HENRY, ... CLEVELAND, OHIO.
ILL, CHARLES L.,. . . . . NEWARK, N. J.

JACOBSON, JULIUS H., ... Toledo, Ohio.
JONES, ARTHUR T., ... Providence, R. I.
KEEFE, JOHN WM., ... Providence, R. I.
LANGFITT, WM. S.,. . . . . Pittsburgh, Pa.
LEIGHTON, ADAM P., ... Portland, Me.
LOTT, HENRY S.,. . . . . Winston, N. C.
McCLELLAN, BENJAMIN B., ... Xenia, Ohio.
MEEKER, HAROLD D., ... New York City.
MILLER, JOHN D., ... Cincinnati, Ohio.
MOOTS, CHARLES W., ... Toledo, Ohio.
PANTZER, HUGO O., ... Indianapolis, Ind.
PFAFF, ORANGE G., ... Indianapolis, Ind.
POTTER, IRVING W.,. . . . . Buffalo, N. Y.
POUCHER, JOHN WILSON, ... Poughkeepsie, N. Y.
REDER, FRANCIS, ... St. Louis, Mo.
RONGY, ABRAHAM J., ... New York City.
RUNYAN, JOSEPH P.,. . . . . Little Rock, Ark.
SADLIER, JAMES E., ... Poughkeepsie, N. Y.
SCHILDECKER, CHARLES B.,. . . . . Pittsburgh, Pa.
SCHWARZ, HENRY,. . . . . St. Louis, Mo.
SMITH, LEWIS W., ... Pittsburgh, Pa.
STILLWAGEN, CHARLES A., ... Pittsburgh, Pa.
STRASSER, AUGUST A.,. . . . . Arlington, N. J.
SWOPE, LORENZO W., ... Pittsburgh, Pa.
TATE, MAGNUS A.,. . . . . Cincinnati, Ohio.
VAN SWERINGEN, BUDD, ... Fort Wayne, Ind.
VANDER VEER, EDGAR A., ... Albany, N. Y.
WEISS, EDWARD A., ... Pittsburgh, Pa.
WERDER, X. O., ... Pittsburgh, Pa.
ZIEGLER, CHAS. E., ... Pittsburgh, Pa.
ZINKE, E. GUSTAV., ... Cincinnati, Ohio.

Total, 63.

The following-named guests were extended the privileges of the floor and invited to participate in the discussions:

Allison, Wesley L.,. . . . . Pittsburgh, Pa.
Armstrong, Robert B.,. . . . . Pittsburgh, Pa.
Baldwin, M. E.,. . . . . Pittsburgh, Pa.
Ballantyne, J. V., ... Wilkinsburg, Pa.
Beach, Wm. M.,. . . . . Pittsburgh, Pa.
Behan, B. H.,. . . . . Pittsburgh, Pa.
Bietsch, Chas. F., ... Pittsburgh, Pa.

Boggs, Russell A., ... Pittsburgh, Pa.
Bornscheuer, B. B., ... Pittsburgh, Pa.
Boucek, A. F., ... Pittsburgh, Pa.
Boyce, John W.,. . . . . Pittsburgh, Pa.
Boyd, D. H., ... Pittsburgh, Pa.
Brenneman, Richard E., ... Pittsburgh, Pa.
Brenner, J. B., ... Pittsburgh, Pa.
Buck, J. M., ... Pittsburgh, Pa.
Burganer, G. L.,. . . . . Pittsburgh, Pa.
Campbell, R. H., ... Homestead, Pa.
Carroll, Thos. B., ... Pittsburgh, Pa.
Cashman, P. C.,. . . . . Pittsburgh, Pa.
Chalfant, Sidney A.,. . . . . Pittsburgh, Pa.
Dagette, A. S., ... Pittsburgh, Pa.
Dearth, Walter A., ... Pittsburgh, Pa.
Dixon, J. W.,. . . . . Wilkinsburg, Pa.
Dornblaser, H. B.,. . . . . Pittsburgh, Pa.
Famel, Joseph, ... Pittsburgh, Pa.
Gilmore, James,. . . . . Wilkinsburg, Pa.
Glynn, W. H., ... Pittsburgh, Pa.
Griffith, John P., ... Pittsburgh, Pa.
Goldsmith, Luba Robin, ... Pittsburgh, Pa.
Goldsmith, Milton, ... Pittsburgh, Pa.
Gorhing, W. G.,. . . . . Pittsburgh, Pa.
Handmacher, B. B., ... Pittsburgh, Pa.
Harris, G. R.,. . . . . Pittsburgh, Pa.
Haworth, Elwood B., ... Pittsburgh, Pa.
Heck, F. H., ... Pittsburgh, Pa.
Heckel, Edward B., ... Pittsburgh, Pa.
Hirsch, Leon, ... Pittsburgh, Pa.
Irwin, John C., ... Pittsburgh, Pa.
Jackson, Daniel F., ... Pittsburgh, Pa.
Langstram, W. H.,. . . . . Homestead, Pa.
Lasday, Louis, ... Pittsburgh, Pa.
Leibold, George,. . . . . Pittsburgh, Pa.
Longsworth, M. J., ... Lima, Ohio.
McAdams, Earl,. . . . . Pittsburgh, Pa.
McCambridge, Chas. John,. . . . . Poughkeepsie, N. Y.
McCurdy, J. R.,. . . . . Pittsburgh, Pa.
McCurdy, S. L.,. . . . . Pittsburgh, Pa.
McKenney, D. C.,. . . . . Buffalo, N. Y.
McNish, George T., ... Alverton, Pa.

Mechling, Curtis S., ... Pittsburgh, Pa.
Meredith, Evan W., ... Pittsburgh, Pa.
Miller, Robert T., ... Pittsburgh, Pa.
Mitchell, Joseph W., ... Providence, R. I.
Mittenberger, Arthur, ... Pittsburgh, Pa.
Moycie, I. J., ... Pittsburgh, Pa.
Murphy, A. I., ... Pittsburgh, Pa.
Murphy, D. M., ... Pittsburgh, Pa.
Permar, Howard H., ... Pittsburgh, Pa.
Ralston, Benedict S., ... Pittsburgh, Pa.
Rectenwald, J. J., ... Pittsburgh, Pa.
Seipel, John W., ... Pittsburgh, Pa.
Shaw, Henry A., ... Pittsburgh, Pa.
Sherrill, A. W., ... Pittsburgh, Pa.
Sieber, P. R., ... Pittsburgh, Pa.
Simmanth, A. M., ... Emlanton, Pa.
Simpson, Theo. P., ... Beaver Falls, Pa.
Singly, John D., ... Pittsburgh, Pa.
Thomas, Vernon D., ... Pittsburgh, Pa.
Thrush, C. A. M., ... Dunnville, Ont.
Titus, P., ... Pittsburgh, Pa.
Todd, Frank L., ... Pittsburgh, Pa.
Walker, W. K., ... Pittsburgh, Pa.
Watson, Anna B., ... New Athens, Ohio.
Weily, Greer C., ... Pittsburgh, Pa.
Whitford, Wm., ... Chicago, Ill.
Wilkins, John C., ... Oil City, Pa.
Wirts, C. D., ... Pittsburgh, Pa.

Total, 78.

FIRST DAY—*Tuesday, September* 14, 1915.

Morning Session.—The Association met in the Assembly Hall of Hotel Schenley at 9:45 A. M., and was called to order by the President, Dr. Charles L. Bonifield, Cincinnati, Ohio.

In the absence of Hon. Joseph Armstrong, Mayor of Pittsburgh, President Bonifield introduced Dr. Edward B. Heckel, of Pittsburgh, President of the Pennsylvania State Medical Society, who delivered the following

ADDRESS OF WELCOME.

Mr. President and Fellows of the American Association of Obstetricians and Gynecologists: It is certainly a great pleasure on this

occasion to extend to you the good fellowship of the medical profession. It is scarcely necessary for me to tell you very much about it, particularly you members of your organization. Most of you who have not been in Pittsburgh since you met here the last time do not perhaps know that Pittsburgh has progressed quite a great deal, and that our hospital facilities have been greatly improved. I think it is ten years since you last met here. The city has progressed wonderfully, and we are therefore doubly glad to be honored with the meeting of your Association in this city at this time. Of course, medicine is peculiar in that physicians belong to the world, and we pride ourselves in being citizens of the world. For that reason, we are glad also that this Association is meeting here at this time because it will give our community an opportunity to see that medicine is absolutely unselfish in its aims and purposes. If we look over the history of the organization, we will see that very much work has been accomplished for the eradication and amelioration of human suffering, especially along one particular line, that dread disease cancer. The meetings of this Society have done more for the elimination of that disease than any other class of men in the country. We are also glad you came here because you will set an example and you will give our citizens an opportunity to show that medicine knows no country; that medicine carries the flag of the world, and by that flag friend and foe stick together. We as physicians work together not for the benefit of ourselves, but for the benefit of humanity, and it gives me great pleasure to welcome you here at this time. (Applause.)

The President.—On behalf of the Association, I will ask our worthy Vice-President, Dr. Davis, to respond to this address of welcome.

Dr. Davis.—Mr. President and Fellows of the American Association of Obstetricians and Gynecologists: Mr. Heckel, I desire to express our thanks for the cordial welcome which you have extended to us. We assure you of our sincere appreciation of your welcome to the City of Pittsburgh. We recall very well that the last time the Association met here it was a notable meeting, and anyone who reads the transactions of that meeting will be impressed with the immense amount of work that was done, the fine papers that were read, and the spirited discussions on them.

These meetings are one of the great events of the year for many of our members. It is true we meet in different parts of the country, but our meetings are always of great interest, and I doubt if any member or any visitor attends these meetings through one day

or three days without getting valuable information. If we think a little outside of this meeting and realize what it means for those who have reached a position of preëminence, leaving their work and preparing papers which take months to prepare and meeting in convention as we do from year to year, we know it means hard work on the part of our members, as each of us in his individual way gives up a great deal. We lay aside our interests and work at home to come here to meet one another and to exchange ideas and, if possible, carry light out farther into the darkness which surrounds some of the problems of medicine.

On behalf of the Association, I thank you, Dr. Heckel, for your cordial address of welcome. (Applause.)

RESPONSE TO THE ADDRESS OF WELCOME BY K. I. SANES, M. D., PITTSBURGH, PA.

Mr. President, Fellows of the Association and Mr. Heckel: On behalf of the American Association of Obstetricians and Gynecologists, I accept your cordial welcome and assure you that every one in this audience highly appreciates your greetings and good wishes.

A Pittsburgher myself, and knowing the work of the Committee on Arrangements, I am certain that nothing will be omitted within the limits prescribed by our good Secretary to make this meeting both useful and pleasant. At the last convention our President remarked that while the Buffalo meeting was a great success, he expected that the one in Pittsburgh would do a little better, for our association, like all healthy organizations, has been gradually progressing. If the degree of success of an organization like ours is to be judged by its attendance at its conventions and by the character of its work, then our organization has been progressing wonderfully indeed. Take the last six years, attendance and exclude 1912, the year of the twenty-fifth anniversary, and you will see a continuous increase in the percentage of attendance—29 per cent., 39 per cent., 41 per cent., 43 per cent., 46 per cent. With this gradual increase of attendance-percentage there has been an increase in the value of its scientific work. This increase is shown not so much by the number of papers, for the number has always been as large as the limited time of the meeting could accommodate, but by the quality of the contributions and discussions. Here it is interesting to note that our association is not only a great contributor to the progress of gynecology and obstetrics, but to abdominal surgery. One has only to look

through our annual transactions to see that the number of contributions to abdominal surgery is very large, exceeding even the number of the gynecological, and that these contributions are among the most valuable ones in literature on this subject.

The work that our association has accomplished in this direction is great indeed. Whenever any important problems were to be solved, whenever any obscure subjects were to be cleared up, our organization was found lending its effort in the direction needed. To its conventions from all parts of the country its members brought their thoughts and experiences, and, passing them through the test of its critical judgment, our association readily gave them to the medical world and to suffering humanity through its journal and its members.

The chief purpose of the American Association of Obstetricians and Gynecologists is not to promote the interest of its members, but to promote the interest of the branches of medical science to which it is devoted, and the interest of the sick that seek relief from these branches of medicine. It is not, therefore, surprising that on many different occasions it was found to raise its voice in a most forceful manner in favor of measures to prevent the diseases, the treatment of which constitutes the chief source of income of its members.

Such is our organization. It has made a national and international reputation for itself and is continuing to add to its prestige every year. This year will be in keeping with its past, judging from the programs and attendance.

Mr. Heckel, please accept again our thanks for the welcome, and our assurance that we will endeavor to make this meeting a credit to our organization and to Pittsburgh. (Applause.)

Papers were then read as follows:

1. "Further Experience with Local Anesthesia in Herniotomy; a Review of One Hundred and Twenty-five Operations," by Dr. Julius H. Jacobson, Toledo, Ohio.

This paper was discussed by Drs. Keefe, Vander Veer, Humiston, and the discussion closed by the essayist.

At this juncture, the Auditing Committee reported having examined the accounts of the Secretary and Treasurer and found them correct, with a balance in the Treasury of $1501.71.

On motion, which was duly seconded, the report was accepted.

2. "Report of a Case of Gall-stone Causing Intestinal Obstruction and Volvulus," by Dr. Rufus B. Hall, Cincinnati, Ohio.

Discussed by Drs. Pantzer, Reder, Dickinson, Carstens, Tate,

Erdmann, Hayd, Vander Veer, Ill, Gilliam, Bell, Darnall, and discussion closed by the author of the paper.

3. "Cholecystectomy versus Cholecystostomy," by Dr. Lorenzo W. Swope, Pittsburgh, Pennsylvania.

Discussed by Drs. Erdmann, Foster, Keefe, Reder and discussion closed by the essayist.

4. "Unusual Contents of Inguinal Hernia," by Dr. Charles W. Moots, Toledo, Ohio.

Discussed by Drs. Hayd, Reder, Dickinson, and Erdmann.

On motion, the Association took a recess until 2:00 P. M.

Afternoon Session.—The Association reassembled at 2:30 P. M., and was called to order by the President.

5. "Surgery of the Appendix," by Dr. John W. Keefe, Providence, Rhode Island.

6. "A Prognostic Sign in Acute Suppurative Peritonitis," by Dr. Hugo O. Pantzer, Indianapolis, Indiana.

These two papers were discussed together by Drs. Dickinson, Gray, Carstens, Hall, Jones, Humiston, and discussion closed by the essayists.

7. "A Rare Congenital Abnormality of the Sigmoid," by Dr. Budd Van Sweringen, Fort Wayne, Indiana.

Discussed by Drs. Davis and Jacobson.

8. "Some Observations upon Post-ureteral Fistula," by Dr. Henry Dawson Furniss, New York City.

Discussed by Drs. Reder, Sanes, and in closing by the essayist.

9. "Mesenteric Thrombosis; Report of Two Cases," by Dr. William E. Darnall, Atlantic City, New Jersey.

Discussed by Dr. Bonifield, and in closing by the essayist.

10. "Remove the Uterus Instead of the Ovaries for Incurable Cases of Menstrual Disorders," by Dr. J. Henry Carstens, Detroit, Michigan.

Discussed by Drs. Darnall, Humiston, Hall, Pantzer, Rongy, and discussion closed by the essayist.

11. "The Use of Sodium Citrate in Direct Transfusion," by Dr. Charles B. Schildecker, Pittsburgh, Pa.

Discussed by Drs. Kahn (by invitation), Jacobson, and in closing by the essayist.

On motion, the Association adjourned until Wednesday, 9:30 A. M.

SECOND DAY—*Wednesday, September* 15, 1915.

Morning Session.—The Association met at 9:30 A. M., and was called to order by the President.

The Secretary read telegrams and letters of regret from Dr. Emery Marvel, Atlantic City, New Jersey; Dr. Louis Frank, Louisville, Kentucky; Dr. Charles A. L. Reed, Cincinnati, Ohio, and Dr. Robert T. Morris, New York City.

The Vice-President, Dr. Asa B. Davis, New York, took the Chair, and President Bonifield delivered his Address. He selected for his subject, "Some Comments on Present Tendencies in Gynecologic and Obstetric Practice."

12. "The Newer Conceptions of Intestinal Stasis," by Dr. George W. Crile, Cleveland, Ohio.

13. "A Contribution to the Conservative Surgery of Chronic Intestinal Stasis," by Dr. Harold D. Meeker, New York City.

14. "Gas Pains; Tympany; Pseudo-ileus," by Dr. Gordon K. Dickinson, Jersey City, New Jersey.

These three papers were discussed together by Drs. Pantzer, Gray, Poucher, Elbrecht, and discussion closed by Drs. Crile, Meeker and Dickinson.

15. "Exhibition of Specimens," by Dr. X. O. Werder, Pittsburgh, Pa.

On motion, the Association took a recess until 2 :30 P. M.

Afternoon Session.—The Association reassembled at 2 :30 P. M., and was called to order by the President.

Dr. Frank D. Gray.—In view of the fact that I and others have got to leave, and that the election of officers is still to follow the scientific program, and in view of the further fact that it is desirable to have every Fellow present during that portion of the meeting, I would move that the order of exercises be changed and the business portion of the meeting be held now.

Motion seconded by several and carried.

(For election of officers, see minutes of executive session.)

16. "The Use of Luteum Extract in Menstrual Disorders," by Dr. Adam P. Leighton, Portland, Maine.

Discussed by Drs. Gilliam, Carstens, Jones, Elbrecht, Pfaff, Dickinson, Pantzer, and discussion closed by the essayist.

17. "The Present Status of Twilight Sleep in Obstetrics Based upon a Collective Study of over Two Thousand Cases," by Dr. Abraham J. Rongy, New York City.

Discussed by Drs. Schwarz, Tate, Pfaff, Dickinson, Bell, Leighton, Davis, Carstens, Bill, Lott, Zinke, and in closing by the essayist.

18. "Report of an Unusual Case of Vascular Myoma, Complicating Pregnancy," by Dr. John Norval Bell, Detroit, Michigan.

Discussed by Drs. Reder, Rongy, Carstens, and discussion closed by the author of the paper.

19. "Chorioepithelioma," by Dr. Ben R. McClellan, Xenia, Ohio.

20. "Fibroid Tumors Completely Obstructing the Uterine Canal; Dead Fetus Lying Retained without Infection," by Dr. Orange G. Pfaff, Indianapolis, Indiana.

Discussed by Drs. Davis, Rongy and Reder.

On motion, the Association adjourned until Thursday, 9:30 A. M.

THIRD DAY—*Thursday, September* 16, 1915.

Morning Session.—The Association met at 9:30 A.M., and was called to order by the President.

21. "The Teaching of Obstetrics," by Dr. Charles E. Ziegler, Pittsburgh, Pa.

Discussed by Drs. Schwarz, Baughman, Bell, Dickinson, Keene, Bonifield, Carstens, and discussion closed by the author of the paper.

An invitation was extended to the Association by Dr. Holland, Director of the Carnegie Museum, to visit the Museum.

22. "The Combined Operation for Interruption of Pregnancy and Sterilization," by Dr. Palmer Findley, Omaha, Nebraska.

Discussed by Dr. Bandler, and discussion closed by the essayist.

23. "Surgical Operations During the Pregnant State," by Dr. Francis Reder, St. Louis, Missouri.

Discussed by Drs. Schwarz, Carstens, Elbrecht, Pantzer, and in closing by the essayist.

DR. RUFUS B. HALL.—I would like to make a motion that Dr. Reder be permitted to read the remainder of his paper after finishing the program this afternoon, for to my mind this is a very interesting subject, and no man can appreciate how interesting it is until he is face to face with the proposition himself. I wrote and presented a paper before this Association along the same lines, and we owe it to ourselves and to the doctor to hear the rest of his paper, so that we can discuss it more in detail.

DR. O. H. ELBRECHT.—I second the motion. (Carried.)

24. "The Value of Pituitary Extract in Obstetrics and Gynecology," by Dr. Samuel W. Bandler, New York City.

Discussed by Drs. Huggins, Ziegler, Goodman, Schwarz, and in closing by the essayist.

25. "Menstrual Statistics; a Study Based on 4500 Menstrual Histories," by Dr. K. I. Sanes, Pittsburgh, Pa.

26. "The Principles of Gynecology," by Dr. Henry S. Lott, Winston, North Carolina.

On motion, the discussion on these two papers was postponed and made the first order of business for the afternoon session.

On motion, the Association took a recess until 2:30 P. M.

Afternoon Session.—The Association reassembled at 2:30 P. M., and was called to order by the President.

The papers of Drs. Sanes and Lott were discussed by Drs. Hall, Elbrecht, Gilliam, and the discussion closed by Dr. Sanes.

27. "Anesthesia in Gynecological Operations," by Dr. R. R. Huggins, Pittsburg, Pa.

Discussed by Drs. Pantzer, Elbrecht, Brown, Bandler, Bonifield, Davis, Hall, and in closing by the essayist.

28. "Colloidal Therapy in Septicemia," by Dr. George Van Amber Brown, Detroit, Michigan.

Discussed by Drs. Baughman, Schwarz, Bonifield, and discussion closed by the essayist.

THE PRESIDENT.—We have lost by death one of the best workers in the Association, Dr. Walter B. Dorsett, of St. Louis.

Dr. Reder has consented to read a memoriam on Dr. Dorsett.

Dr. Reder then read the memoriam.

The President appointed Drs. Hall and Schwarz to conduct the newly elected President to the Chair.

Dr. Bonifield, in presenting his successor, said: Before yielding this gavel to the new President, I wish to thank every member who has been present for adding to the interest of this meeting; also to thank you for the courtesy every one of you have shown the Chair, and to express the hope we may all live to meet in Indianapolis next year. (Applause.)

Dr. Pantzer, I give you this gavel, and I hope you will wield it with as much pleasure as I have done. (Applause.)

DR. PANTZER, in accepting the Presidency, said: Mr. President and Fellows: In bestowing upon me the greatest gift within your keeping, the greatest honor that can come to me, I wish to assure you that it is received with the deepest emotion. I very largely confined my attachments to a few societies and have cultivated them not only to the extent of being repaid by a closer cultivation of fewer men, but by the richness of knowledge of these men which more than compensates for a superficial acquaintance with many.

My interest in the Fellows of this Association has steadily increased from year to year, and has awakened within me a fondness

for the Fellows that to receive this honor is to me a matter of the utmost gratification. I know there are in this Association some Fellows who I would just as soon see have this honor as myself. On the other hand, I wish to say that as an expression of your cordial friendship and esteem, it is greatly appreciated, and I thank you most heartily and cordially. (Applause.)

Having burdened me with the task, I now wish to express the hope that you will aid me in making the year of my office one of success equal to that of my predecessors, and with your coöperation and assistance we will try to make the Indianapolis meeting a success worthy of this great organization. Gentlemen, I thank you. (Applause.)

THE SECRETARY.—As I am the first upon the floor when we begin and the last to leave it, I am obliged to make a final statement. It is extremely gratifying to state that the average attendance in the six meetings we have had amounted to ninety-nine. At the first meeting there were seventy-eight; at the second, one hundred and five; at the third, one hundred and twenty-eight; at the fourth, one hundred and five; at the fifth, ninety-eight, and to-day there were seventy-eight, making an average of ninety-nine.

DR. RUFUS B. HALL.—Before we adjourn, I move that we extend the thanks of this Association to the Fellows of the Local Committee of Arrangements for the work they have done and the entertainment given us.

THE SECRETARY.—Such a motion has already been passed, but there is one thing we have forgotten. We rarely obtain the proper recognition on the part of the daily press, and in most instances when we do get an extended report, it is sensational in character and hardly worthy of the Association, but the Pittsburgh Press has been an exception. There has been nothing sensational in the newspapers in connection with the reports of our proceedings. Some of the features that might have been easily turned into severe public criticism have been left out. I therefore think it is wise and proper that we give the public press of Pittsburgh a vote of thanks for their conduct toward us.

DR. HALL.—I second the motion. (Unanimously carried.)

As there was no further business to come before the meeting, on motion, which was duly seconded, the Association adjourned to meet in Indianapolis, Indiana, subject to the call of the Executive Council.

E. GUSTAV ZINKE, M. D., *Secretary.*

EXECUTIVE SESSIONS.

Tuesday, September 14, 1915.

The President, Dr. Charles L. Bonifield, in the Chair.

The President.—The first business of this session is the election of new Fellows to membership.

The Secretary read the names of Dr. Edmund Dougan Clark, Indianapolis, Indiana; Dr. James Ethelbert Davis, Detroit, Michigan, and Dr. Jennings Litzenburg, Minneapolis, Minnesota, and stated that they had been acted upon favorably by the Executive Council and recommended to the Association for election.

Dr. Rufus B. Hall.—I move that the action of the Executive Council be endorsed, and that the gentlemen whose names have been read be elected.

Dr. X. O. Werder.—I second the motion. (Carried unanimously.)

The Secretary read a telegram from Dr. Lewis S. McMurtry, of Louisville, regretting his inability to attend the meeting. He also read letters of regret from Drs. Ernst Jonas, St. Louis, Missouri, and from Dr. John B. Murphy, Chicago.

The President.—The next in order is the report of the Secretary.

The Secretary read his report, stating that the Association had lost one member by death during the year, Dr. Walter B. Dorsett, of St. Louis, and he had also received the resignation of Dr. Deaver, of Philadelphia. He had received in dues and initiation fees $2455, all of which had been turned over to the Treasurer.

The Treasurer, Dr. Herman E. Hayd, of Buffalo, presented his report, stating all bills had been paid, that the Association was in good shape, with a balance of $1301.71 in the Treasury. (Applause.)

The President appointed as an Auditing Committee, to audit the accounts of the Secretary and Treasurer, Drs. Werder, Pantzer and McClellan, and stated that this Committee would report at a subsequent meeting.

The President.—The Council directed that Dr. Dickinson prepare a letter of condolence to be sent to Dr. Yates, who had lost his wife.

Dr. Werder read the message, which was ordered to be sent to Dr. Yates as a telegram.

There being no further business to come before the Executive Session at this time, on motion of Dr. Hall, seconded by Dr. Hayd, the meeting adjourned.

Wednesday, September 15, 1915.

The Executive Session was called to order by the President at the Country Club at 3:00 P. M.

THE PRESIDENT.—Nominations for President are in order.

Dr. Asa B. Davis nominated for President Dr. Hugo O. Pantzer, Indianapolis, Indiana.

The nomination was seconded by several Fellows, and on motion of Dr. Frank D. Gray, which was duly seconded, the rules were suspended and the Secretary instructed to cast the ballot of the Association for Dr. Pantzer as President for the ensuing year, which he did, and Dr. Pantzer was declared duly elected.

There were cries of Speech! Speech!

DR. PANTZER said: I want to express my appreciation of the great honor you have conferred upon me. I come to these meetings yearly and meet you and profit by hearing the papers and the discussions on them. Such papers and discussions have been a great stimulus to me all these years. I want to say, I have not words to express to you my feelings on the present occasion, but I will do so sometime. (Applause.)

THE PRESIDENT.—Nominations for First Vice-President are in order.

Dr. Magnus A. Tate nominated Dr. Gordon K. Dickinson.

Dr. Frank D. Gray moved that the rules be suspended, and that the Secretary be instructed to cast the ballot of the Association for Dr. Dickinson as First Vice-President.

Seconded and carried.

The Secretary cast the ballot as instructed, and Dr. Dickinson was declared duly elected.

THE PRESIDENT.—Nominations for Second Vice-President.

Dr. J. Henry Carstens nominated Dr. Orange G. Pfaff, Indianapolis, Indiana.

Dr. X. O. Werder moved that the rules be suspended and the Secretary be instructed to cast the ballot of the Association for Dr. Pfaff as Second Vice-President.

Seconded and carried.

The Secretary cast the ballot as instructed, and Dr. Pfaff was declared duly elected.

THE PRESIDENT.—Nominations for Secretary.

Several Fellows nominated Dr. Zinke for Secretary to succeed himself, and on motion, duly seconded, the rules were suspended

and the President instructed to cast the ballot of the Association for Dr. Zinke as Secretary.

The President cast the ballot as instructed and Dr. Zinke was declared duly elected.

There were cries of Speech! Speech!

Dr. Zinke said: Mr. President and Fellows: Time is precious, so I will not waste it in words, except to say that this is the only Association of this character, not only in the United States, but in the world. We issue an unusually fine volume of transactions, and have every reason to be proud of the work that has been done; and, judging from the spirit displayed at this meeting, I feel certain that the *esprit de corps* of our Association was never so high and never so thoroughly appreciated by its own members as now. This is a great pleasure and comfort. (Applause.)

The President.—Nominations for Treasurer.

Dr. Asa B. Davis nominated Dr. Herman E. Hayd, of Buffalo, to succeed himself.

Dr. Gordon K. Dickinson seconded the nomination and moved that the rules be suspended and the Secretary be instructed to cast the ballot of the Association for Dr. Hayd as Treasurer.

Seconded and carried.

The Secretary cast the ballot as instructed, and Dr. Hayd was declared duly elected.

The President.—On account of Dr. Pantzer having been elevated to the Presidency of this Association, there is a vacancy in the Executive Council, and nominations are in order to fill that vacancy.

Dr. Francis Reder nominated Dr. Magnus A. Tate, of Cincinnati, Ohio.

Dr. Henry S. Lott seconded the nomination and moved that the rules be suspended and that the Secretary be instructed to cast the ballot of the Association for Dr. Tate.

Seconded and carried.

The Secretary cast the ballot as instructed and Dr. Tate was declared duly elected.

The President.—The next in order is the time and selection of the place of meeting for the ensuing year.

Dr. Charles W. Moots moved that the meeting next year be held in October instead of September.

Motion seconded.

After discussion, which was participated in by Drs. Carstens,

Bonifield, Hall, Zinke, Elbrecht, it was moved as an amendment that the time of meeting be left to the Executive Council to decide.

The amendment was seconded, accepted, and the original motion as amended was carried.

The Secretary read a communication from Miss Anna R. Mayhood bearing on the Suffrage Amendments.

Dr. Rufus B. Hall moved that the communication be laid on the table.

Seconded and carried.

THE PRESIDENT.—Place of meeting.

Dr. Gordon K. Dickinson moved that the next meeting of the Association be held at Indianapolis, Indiana.

Seconded and carried.

DR. JOHN W. KEEFE.—I move that we extend a vote of thanks to the physicians of Pittsburgh who have entertained us; and also that our thanks be extended to the members of the Association in Pittsburgh who have done so much to make our visit a pleasure to us.

This motion was seconded by several and carried unanimously.

DR. FRANK D. GRAY.—If there is no further business to come before the meeting, I move we adjourn.

Seconded and carried.

The Executive Session thereupon adjourned.

E. GUSTAV ZINKE, M. D., *Secretary.*

PAPERS

READ AT THE

TWENTY-EIGHTH ANNUAL MEETING

OF THE

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS

HELD AT

HOTEL SCHENLEY

PITTSBURGH, PA.

SEPTEMBER 14, 15 AND 16, 1915

TRANSACTIONS OF THE AMERICAN ASSOCIATION OF OBSTETRICIANS AND GYNECOLOGISTS.

Proceedings of the Twenty-eighth Annual Meeting held at Pittsburgh, Pa., September 14, 15 and 16, 1915.

The President, CHARLES L. BONIFIELD, M. D., *in the Chair.*

President's Address.

SOME COMMENTS ON PRESENT TENDENCIES IN GYNECOLOGIC AND OBSTETRIC PRACTICE.

BY

CHAS. L. BONIFIELD, M. D.,

Cincinnati, O.

FELLOWS of the American Association of Obstetricians and Gynecologists: The rules of our Association demand that I, as your presiding officer for the year, occupy at least a few minutes of your time with an address.

I wish to begin by thanking you most heartily for honoring me by electing me to this exalted position. I regard it as the greatest honor that has ever been conferred on me and expect none greater in the years to come. I realize that for it I am indebted more to your generosity than to any achievements of my own and that thanks, no matter how deeply felt or fully expressed, are a very insignificant return for so great a favor. All I can give you in addition is a faithful performance of the duties of the office and a pledge of continued active interest in the Society when I shall have returned to the ranks.

Custom requires me to express my views as to some of the achievements of the recent past, the present status, and the outlook for the future of those branches of the healing art to which this Society is devoted. In the early life of the Society it was comparatively easy for the President to occupy the time allotted to him with a review of the progress for the preceding year, for gynecology was a new science then and the strides forward were both long and numerous. New operations, modifications of old ones, and improvement in technic followed one another so rapidly that within the elapsing time between meetings there was ample material. But now progress is

not so rapid, chiefly because there is not so much to make. I shall not on this account, however, follow the example of a former President of a sister society and after a critical study of the transactions of previous meetings inform you that medical literature would be just as rich had the majority of your papers never been written. On the contrary, I believe this Society has done splendid work, having had much to do with bringing the practice of obstetrics, gynecology and abdominal surgery to its present satisfactory state.

It is often necessary for a fact to be reiterated again and again to convince the rank and file of the profession of its truth. A former distinguished teacher of mine once remarked in my presence that he was frequently as much indebted to one who recalled to his mind a half-forgotten fact, as to another who gave him a new one. Certain it is that the writer, who states clearly and forcefully the discoveries of others, often has more to do with their dissemination than the discoverers. I, therefore, congratulate the members of this Society on the excellent papers they have read before it and the fearless way they have been discussed, rather than chide them for not having done better.

The elder Gross predicted that gynecological societies would cease to exist because they would soon exhaust the field of so limited a part of surgery. In more recent years one of the most distinguished of American gynecologists referred to gynecology as a "passing speciality." It has not yet passed and I think the day is far distant when a surgeon properly trained as a gynecologist cannot find enough work to keep him well employed and enough income to secure him the comforts of life in any populous district of the country, if he cares to limit his practice to the speciality. But it is a fact that the diagnosis and operative treatment of gynecologic conditions, aside from malignant disease, has become so satisfactory, that radical improvements are not to be expected.

One method of diagnosis, vehemently recommended by some operators in recent years, seems to me to be seldom needed. I refer to the opening of the uterus. The greater one's familiarity with intra-abdominal conditions, the less frequently he finds it necessary to do an exploratory abdominal section. Hysterotomy will find more frequent employment in the hands of the general surgeon who has broadened his field to include gynecology, than in the hands of a gynecologist who has studied at the feet of a master of the art.

It is from the laboratory rather than the operating room that further success in dealing with cancer is to be expected. The importance of early diagnosis and operation is thoroughly recognized by the

surgeon, if not by the laity, and the radical and painstaking operations now performed have nearly reached the limit as to thoroughness. Further experience with radium has pretty well demonstrated the position it should occupy in cancer therapy. That it is a distinct addition to our munitions for warfare against the disease, and that it should be given a trial on all cases too deep-seated for *x*-ray treatment, and for any reason not amenable to complete removal by the surgeon's knife, few will deny; that it should take the place of the knife in the hands of the experienced surgeon when he considers the case operable, few will claim. In estimating the results of a given treatment of cancer it is to be remembered that cancer differs materially in the degree of its malignancy. Dr. Harvey Gaylord has called attention to the fact that some of the tumors with which he succeeded in inoculating mice had such a low degree of malignancy that even incomplete removal served to cure the animal. I believe that every surgeon of ten or more years experience in dealing with cancer can recall cases in which at the conclusion of his operation he felt that it had been inadequate, and yet the patient lived many years without a recurrence; and can recall others in which, when the operation was completed, he was well satisfied with his efforts, and expected a more or less lasting immunity, only to be disappointed by a rapid recurrence and a fatal termination at an early date. For this reason, it is never wise to claim unusual results in the treatment of cancer by any method until the cases are large in number and have survived the treatment a considerable number of years. It seems probable that the limit of usefulness of the *x*-ray has not yet been reached. There is no reason to believe that there may not be further improvement in both apparatus and technic.

The treatment of fibroid tumors of the uterus by the *x*-ray has shown some satisfactory results as far as the relief of symptoms go. It has long been known that, without precautions, he who makes frequent use of the *x*-ray, will be rendered sterile by its action on his testicles. It may be that the action of this agent on fibroids is by means of its destruction of the function of the ovary. If this be true, its usefulness will be limited to that class of cases which in former years have been benefited by removal of the ovaries. The surgical treatment of uterine fibroids in the hands of an operator skilled in pelvic surgery is now so successful and satisfactory in every way, that any other form of treatment will have to show brilliant results to supplant it.

The medical profession through the works of Rosenow and others has learned much of importance of chronic septic infection caused by

small foci of infection situated particularly in the tonsils and at the roots of the teeth. My distinguished uncle, Dr. Thaddeus A. Reamy, a number of years ago, reported cases of cure of rheumatism by curing septic endometritis.

Much interest has been shown in the toxemia due to colonic stasis. I have read two short papers on this subject before the Society, and I see no reason for changing the opinions expressed in them, which may be summarized as follows: *First*, preventive treatment is of prime importance. *Second*, medical and hygienic treatment bring relief in a large proportion of cases. *Third*, in a smaller number of cases some form of surgical treatment offers the only hope of relief. *Fourth*, ileosigmoidostomy gives the best results. *Fifth*, it is not usually necessary to remove that portion of the bowel whose function is eliminated by this operation.

Since our last meeting, I have tried lateral cecosigmoidostomy on three cases. In none of them has it given the relief of symptoms I had become accustomed to expect from ileosigmoidostomy. I made the opening between the cecum and the sigmoid of ample size, but have every reason to believe that a large part of the bowel contents continue to travel by the old route. I believe this to be due mainly to the fact that the peristaltic wave travels in opposite directions in the cecum and in the sigmoid.

The fact that the originator of the short-circuit operation and some of his followers have in their enthusiasm carried its use beyond the realm of reason, is no argument against its use when the indications for it are clear and distinct.

The comparatively satisfactory results obtained by modern surgical technic has led to renewed interest in anesthesia, preparatory treatment and after-treatment in order that the recovery of the patient may not only be as sure as possible, but as comfortable and as rapid as possible. As to anesthesia, there are two tendencies which seem to me to be quite opposed to each other and to demonstrate a fact most of you have, doubtless, observed that comparatively few medical men think for themselves. We claim to be the most progressive of all professions, to recognize no authority but demonstrated truth; but, as a matter of fact, the great majority of us follow like a flock of sheep some wether, that for the time being, is wearing the bell of fame.

On the one hand, we have surgeons and hospitals that employ nurses instead of physicians to administer anesthetics. On the other hand, we have physicians who will have an anesthetic given only by a graduate in medicine, who makes a speciality of its administration.

To which class the average man belongs depends on whose shrine he happens to be worshiping at the present time. One will claim that a nurse can be taught to give an anesthetic as well as a physician, on the same principle that the foreman of a factory tells you that one need not be a skilled machinist to make some one part of an automobile. I have seen many women doing fancy needle work that could sew better than I can, but I have never thought it wise to employ one of them to sew up my incisions. I have seen many butchers that could use a knife with more dexterity than I, but I have never called one of them to open an abdomen for me. I still believe that my medical education is of some value to me as an operator. I am not inclined to go back to the days of the barber-surgeon when the medical man stood by and told him what to do. I prefer my anesthetics given by someone whose knowledge of anatomy, physiology and therapeutics enable him to meet emergencies that may arise without much direction or supervision on my part. Aside from the interest of the patient, there are two reasons why doctors, instead of nurses, should administer anesthetics. The first is, there is not enough work for the doctors now. They are entitled to the income they can legitimately earn in this way. The second is, that having a nurse do this work encourages her to prescribe and do other things for which she is not trained. The others claim that the administration of an anesthetic is so important that only a very few men or women are competent to do it. The professional anesthetist is a useful member of the profession, but naturally likes to magnify his calling, so he provides himself with expensive and complicated apparatus that makes the operating room look like the inside of a submarine. Then on the same principle that you blindfold a horse to get him into a place he fears to go, he gives the patient a hypodermic or morphine, so he will not be scared to death at the sight of them. The anesthetic must be a mixture of agents. Old-fashioned ether or chloroform are not up to date at all. Too many people understand pretty well how to use them. I do not claim that ether or chloroform are such perfect anesthetics that none better will ever be discovered. I do not claim that nitrous oxide is not a useful agent and that there are cases where it is preferable to either of the others, but I do claim that it has not been proved that gas is safer than ether as the routine anesthetic for major surgical operations; the fact that its most ardent advocates insist that it be given by an expert is evidence that it is not; that ether properly given is always a stimulant; that it is safer for a patient to be so anesthetized; that there is no reaction to trauma, when less completely anesthetized; that

ether vapor at the temperature of the body is less irritating than if cooler; that carbonic acid gas is as useful an adjuvant to ether as nitrous oxide, and is the natural stimulant for respiratory centers; that the seriousness of the after-effects of ether has been exaggerated in the mind of the profession; that the dangerous after-effects can be reduced to a mininum by rendering the patient's urine alkaline in reaction before and after administration and by administering it in accordance with the beliefs above expressed. I further believe that public hospitals should have professional anesthetists on the staff not so much to administer the anesthetic as to teach interns how to to do so.

I am glad to see that these views, which I have long held, have the support of Dr. John Bryant of Boston and Prof. Yandell Henderson of Yale Medical School. (See *Journal of A. M. A.*, July 3, 1915.)

One of the improvements to be made in the future of surgery is a more accurate way of estimating the surgical risk in a given case. It is well known that certain individuals withstand operation from which a majority of people would die. Others succumb where the majority would survive. We are able to recognize some of the conditions of the heart, the lungs and the kidneys that render one a poor surgical risk. A knowledge of the blood pressure is also valuable. But there is still something that eludes our present means of investigation. Because our methods of estimating the risk are still incomplete and imperfect, is no reason for neglecting to use those we have to the best advantage. The surgery that the masses receive is not the surgery of a few selected leaders with special endowment by nature, special training and special facilities. I think it can safely be said that the average patient, when she consults a surgeon, has her heart and lungs not very carefully listened to by the surgeon himself. Then she is sent to the hospital and the interne is instructed to examine the urine. This, by some interns, is conscientiously done; by others, I am sure, the examination amounts to little more than looking at the urine. Not infrequently the recognition of some abnormality other than the one for which the operation is to be performed, would lead to its postponement and suitable preliminary treatment would change the risk from a very poor one to a comparatively good one, and this in turn would give a lessened mortality rate in the year's work.

This leads me to repeat what has often been said by others that there should be more and better team work between the surgeon and the internist; and leads me to add that if more surgeons did family

practice for five years before specializing they would less frequently need the advice of a skilled internist and more frequently avail themselves of it.

In the after-treatment the internist may assist in the early recognition of some complication, such as pneumonia, but the surgeon must be the supreme authority in the treatment of the case. The operation having been done, the case is his, and he must assume the responsibility of its treatment. There is often more than one way of attaining a desired result. One man may be competent to secure it in one way, another in another. There may be two good roads from Pittsburgh to Cincinnati. I might be able to drive you safely and comfortably over one road, someone else may be able to do the same over the other, but if you employ us both and we decide to compromise on a byeway that runs half way between the highroads, it will be doubtful if your destination is ever reached. "Too many cooks spoil the broth" and too many doctors have hastened many a patient to an untimely end.

The after-treatment of a patient subjected to abdominal section is still worthy of some thought. "Safety First" should be the rule of the surgeon as well as the railroad man or an automobilist. Minor considerations are comfort (of the patient) and speed (of recovery). I believe that it is reasonable to assume that every abdominal section is followed by peritonitis. In the vast majority of cases it is so slight in character that its symptoms are scarcely perceptible, and an early recovery is assured from the beginning. There is every grade of severity from this, to the case that is doomed to die from peritonitis when the incision is closed. This supposition is made reasonable by the common knowledge as to the reaction of the peritoneum to traumatism, by the known omnipresence of germ life, and by the frequency of the existence of peritoneal adhesions in patients who have recovered. If this supposition is correct, the after-treatment is really the treatment when the patient has recovered from shock and the immediate effects of the anesthetic, of peritonitis. The fact that many cases require practically no treatment is irrelevent. The same thing may be said of many cases of acute infectious diseases.

In the Transactions of this Society for the past year is to be found a very thoughtful and instructive paper by Dr. Crile. He shows that many of the symptoms of peritonitis, the arrest of peristalsis, the intestinal distention, the muscular rigidity, the peritoneal exudate are protective measures, directed toward limiting the area of infection. There can be no question as to the truth of this interpreta-

tion of the symptoms, but to the treatment this line of thought leads him to adopt, I cannot give my unqualified approval. I say this with hesitation, for I know that Dr. Crile's reputation as a surgeon, as an observer and an investigator, is both great and well deserved.

He says: "If the body-wide disturbances caused by peritonitis are adoptions for defense, then we must conclude that death is caused by an excessive discharge of the body's store of energy in maintaining this defense. Our problem, therefore, must be to discover some means by which the method of defense evolved by nature may be maintained at the same time the energy of the body is conserved as far as possible." Because the body makes strenuous efforts to repel the invasion of the foe, it does not necessarily follow that if death ensues it is due to the exhaustion of the body by these efforts. Belgium made strenuous efforts to repel the German army, but it was not these efforts that destroyed her. Her destruction occurred because her efforts were ineffectual. Nature makes every effort to limit a peritonitis. If her first line of defense is effective the patient is almost sure to recover. The inflammation may go on to suppuration, and if the resulting abscess does not find an exit for itself, or the surgeon fails to evacuate it, the body may wear itself out in the fight. If the first line of defense is not effective another barrier may be erected. Now the enemy is in possession of a larger territory, the condition of the patient is more grave, but it is rare that exhaustion follows. The peritoneum presents an immense surface for the absorption of toxins. If all or even a very large part of it becomes infected, absorption is so rapid that death is the rule; not because the body has exhausted itself in trying to limit the peritonitis, but because the efforts at limitation have failed. The whole body is overwhelmed by the foe. There are several ways in which one nation may help another when a foe invades its territory. *First*, it may attack the foe in its own way. *Second*, it may help keep it confined to a limited area. *Third*, it may sustain its ally and leave it to do its own fighting.

In treating peritonitis any one or all of these methods may be employed. It is the concensus of opinion that the first method is the best in the treatment of peritonitis originating in the appendix. The surgeon attacks and destroys the organ in which the enemy is entrenched. If, in so doing, he breaks down the peritoneal line of defense, it matters little—the main army of invasion has been destroyed.

With equal unanimity the profession makes use of the second in the treatment of peritonitis of tubal origin. Every effort is made to

assist the peritoneum in its efforts, which are usually successful, to limit the inflammation to the pelvis. Surgery is reserved for the results of the infection; it is not directed against the infection. In other words, we remove the dead from the battlefield after our fight is over.

Dr. Crile would teach us that morphine is not only of great value in the second method, but is our main weapon in the third. That morphine arrests peristalsis and favors the formation of adhesions is not questioned. That it delays absorption, I am willing to believe, and I should be inclined to attribute the protective influence he has observed in the brain, liver and suprarenals to this action rather than to the specific action it has on these structures. He says, "I have found that infection produces in the brain, the suprarenals and the liver histologic changes which are identical with the changes which are characteristic of exhaustion from any cause—running, fighting, trauma, etc. Let us paraphrase this statement to read as follows: Dr. Crile has found exhaustion from any cause—severe exercise, trauma, etc., to produce changes in the brain, liver and suprarenals identical with those caused by peritonitis, *i.e.*, a systemic infection. This gives us the thought that severe exertion gives rise to a poison that has the same effect on the brain and other structures as an infection. The fact that severe exertion forms a poison is borne out by the observation of Prof. Martin Fischer that college athletes in perfect health show albumin in the urine after a severe contest with their fellows. That it is a poison whose influence on the function of the kidneys can be readily conteracted is proved by the further observation that if the athlete partakes freely of oranges before engaging in the contest albumin will not manifest itself.

At one time the profession, following the teaching of Alonzo Clark, employed opium as the routine treatment of peritonitis. That was before the days of abdominal surgery. Any treatment that relieves one or more of the prominent symptoms of a disease, even temporarily, will become the fashion for a time if it be enthusiastically recommended by some prominent member of the profession. As for example, the treatment of typhoid fever with antipyretic drugs. If it has some real merit, the treatment will last for some time, until something else is brought forward to take its place. If it is a real remedy, it will stand the test of time even though its action cannot be scientifically explained. This was true of quinine. After its value in the treatment of malaria was once recognized, its use was never abandoned, though many years elapsed before the

cause of malaria was discovered and the action of quinine satisfactorily explained.

The use of opium in peritonitis held sway for a number of years, but was abandoned. This would indicate that it had some merit, but that it was not entirely satisfactory. It was surgery that displaced opium. When opium was at the height of its favor, there was no such thing known as removing the appendix or gall-bladder or as closing the typhoid, duodenal or gastric ulcer, thus removing the source of infection. The only thing to be done was to let nature wall-off the infected area, as a captain at sea when his ship leaks may be able to do nothing more than limit the water to one compartment. Opium not only held the intraperitoneal structures quiet while nature glued them together, but it was and still is the best known drug to relieve shock following perforation. If the aid of surgery is not to be evoked the Alonzo Clark treatment is, doubtless, still the best. Lawson Tait taught that opium was injurious after operation; that early purgation was "a consummation devoutly to be wished." It may be that Tait in his enthusiasm magnified the deleterious effects of opium as well as the beneficial effects of early purgation. Here, again, the fact that this treatment was almost universally adopted and continued in vogue for a number of years is evidence that it possessed some merit.

Let us see if we can explain what merit it possessed and why it is not popular to-day. It was based on the following assumptions: *First*, that fluid in the peritoneal cavity after an operation was an excellent culture medium for germs; *second*, that as the peritoneum readily absorbs salt water, the contents of a parovarian cyst and the more fluid constituents of blood; and, as ascites can be reduced by saline purgation, he could secure the absorption of fluid in the peritoneal cavity subsequent to operation by purgation, thus draining the peritoneum through the bowels, as he expressed it; *third*, that opium was contraindicated because it rendered purgation more difficult or impossible.

We all recognize that his first assumption was correct, otherwise we would never use drainage. In his second he failed to take into account the fact that a damaged peritoneum does not absorb fluids as readily as a healthy one and that it is the damaged peritoneum that pours out the fluid, and causes the necessity for drainage.

But is there not some other way in which purgation may have been beneficial? It is known that the intestinal tract contains many germs, and that under certain conditions these germs are very harmful. For instance, in intestinal obstruction, the contents of the

bowel above the obstruction becomes poisonous. If, after the obstruction has existed some time, it be relieved and the retained contents be allowed to enter the healthy bowel, death will usually ensue. When the bowels are overdistended with gas and peristalsis is paralyzed as a result of peritonitis, practically the same conditions exist within the bowel as when a mechanical obstruction is present. The value of gastric lavage in such a case is not altogether due to the rest it gives the patient. Opium would give the desired rest. Lavage removes quantities of poisonous fluid. Before I was familiar with the benefits to be derived from washing out the stomach in such cases, I have observed patients in whom the bowels resisted all efforts at purgation for a number of days, and when they finally yielded there was every evidence of the absorption of toxic material and death ensued in about twelve hours. It may be said that it was approaching death that permitted the bowels to move. I can only answer that it was not the clinical picture, and if one variety of obstruction produced a poison, it is reasonable to presume another variety will do so. Purgation removes the poisonous contents of the bowels in the natural way. This being true, it is a valuable method of treatment when peristalsis can do no harm. Peristalsis is not harmful except that it scatters infection. Therefore, if there be no infection to scatter, or if it has already been spread throughout the peritoneal cavity, it is harmless. In the majority of operations, excepting simple drainage, the bulk of the infection and the source of supply have been removed, there is not enough left behind to cause serious results, if it be somewhat scattered, and the operative procedure itself has scattered it sufficiently to make it impossible to restrict it to any very limited area. Under such circumstances it seems to me, that while purgation may not be necessary, it is not contraindicated. If nature stops peristalsis and distends the bowel with gas in order that adhesions may form, then purgation, by keeping up active peristalsis and causing the gas to pass, is an efficient method of preventing adhesions following operation. Probably the reason why purgation became somewhat obsolete is not because it did not serve a good purpose, but because the improvement in surgical technic made it less essential to the patient's recovery. That in the blind following of the dictum of a leader patients were allowed to die from exhaustion, when they might have been saved by the judicious use of a sufficient amount of an opiate to secure needed rest and relief from pain, is probable. Personally I have always endeavored to protect the patient from this misfortune by the use of codein and chloral; I have usually found they answer the

purpose and do not produce the nausea and constipation which so frequently follow the administration of morphine to those unaccustomed to its use.

Dr. Grear Hill Baker, of San Antonio, Texas, tells me that he gives his patients a hypodermic of pituitrin at intervals of six hours after they have been subjected to an abdominal section. At the end of thirty-six hours he administers a purgative enema, and this causes a free evacuation of the bowels without the administration of any other purgative.

The Ochsner treatment of appendicitis was founded on accurate clinical observation and logical reasoning; but, I am sure, that its promulgation caused the death of many people because it was applied when prompt surgical intervention offered the only means of cure. I am fearful that the revival of the opium treatment of peritonitis will have similar results. It is not so many years ago that the surgeon, when called to see a case of appendicitis, nearly always found the symptoms more or less completely obscured, and the medical attendant as well as the patient misled as to the gravity of the situation by the free use of morphine as a mode of treatment. It is to be hoped that this condition of affairs will not recur.

The use of vaccines in the treatment of infections has already given some brilliant results and promises much for the future.

OBSTETRICS.

I recall reading an article, about the time I graduated in medicine, by the late Dr. Robt. Harris, of Philadelphia, in which he showed that up to that time the Cesarean sections performed by American surgeons showed a greater mortality rate than those performed by American cows. Certainly, we have traveled far since that time. But is not the advance more a surgical than an obstetrical one? When a Cesarean section is performed the case is either turned over to a surgeon or the obstetrician becomes, for the time, a surgeon. It is purely a surgical procedure. Has obstetrics itself in that time made rapid strides? I have not practised obstetrics for a number of years and may be mistaken, but it seems to me it has not. True, the laws of asepsis are more rigidly enforced than they were then; more patients go to a hospital for delivery now than they did at that time. Pituitrin has been introduced and twilight sleep is abroad in the land. It is claimed by some good observers that the physiological action of pituitrin is identical with that of ergot and that twilight sleep has benefited some sensational magazines more than

it has parturient women. But the family physician of to-day is little better prepared to meet and grapple with the real problems of obstetrics than was his predecessor of a quarter of a century ago. And it is by the family physician that the majority of cases are attended. One of the main reasons for unsatisfactory progress is that obstetrics is inadequately taught at the medical colleges. This is not so much the fault of the teachers of obstetrics as it is the management of the schools. They raise money for full-time men in other departments, but do not place enough money at the disposal of the obstetrician to enable him to devote a sufficient amount of his own time, or pay for the time of an able assistant. Their fellow professors often fail to appreciate either the import tance of the subject or to supply the means necessary to teach it properly. I overheard a teacher tell a class, when he had come to fill the hour for the obstetrician, who could not be present, that they need not worry over his absence as "babies had to all enter the world through the same passage." As a consequence of this attitude men are graduated with an imperfect knowledge of obstetrics and little enthusiasm for its practice. Most of them will tell you they "take obstetric cases only as a means of holding their families."

The remedy for this state of affairs is the education of a larger part of the laity to the necessity of having a good obstetrician and a willingness to pay him a fee commensurate with the time and skill they demand.

The exploitation of anything new in medicine by the press, before its proper status has been carefully worked out by the profession, is always unfortunate and the publicity given to twilight sleep is no exception to the rule. By the judicious use of morphine and chloral in the earlier stages and of chloroform in the later, labor has for years been robbed of its severest pangs. If the addition of scopolamine enables a smaller dose of morphine to relieve the pain, then the latter will interfere less with uterine contractions. But in the published reports of cases we find that efforts to secure twilight sleep result rather frequently in the birth of "blue babies." "Safety First" is a good slogan for the obstetrician. Safety not only for the mother but also for the child. It is claimed that though the woman in labor gives every evidence of pain during the twilight sleep, she has no recollection of it afterward. It seems hardly necessary to give a drug for this purpose; for the speed with which the joy of maternity overshadows the pangs of parturition is almost proverbial. Were it not so the number of parents with only one child would be much larger than it is.

The most that can be said for twilight sleep at the present time is that it is worthy of further investigation in the hands of those competent to make it.

The treatment of eclampsia is still the subject of considerable discussion. Last year we had two papers contributed on this subject: one advocating the rapid evacuation of the uterus by vaginal Cesarean section, the other advising the so-called "Dublin Method," which makes rapid delivery a matter of minor importance. The statistics quoted by Dr. Leighton proves conclusively what has long been my opinion, that emptying the uterus is not the most important treatment of patients in eclampsia. The statistics of those who favor it give a mortality rate of from 16 to more than 38 per cent., while Stroganoff and Tweedy secured a mortality rate of 6.5 and 8.11 per cent., respectively. Of course, the pregnancy causes the poisoning of the patient and emptying the uterus stops the formation of the poison, but when a man is in a boat that is leaking, it is important to stop the leak, but to pump out the water that has already gained ingress is more urgent. This is true in eclampsia. The most important thing is to get rid of the poison that has already been absorbed and is circulating through the system. The stopping of the formation can safely be delayed while this is being accomplished.

In the immediate control of the convulsions, I wish to again emphasize the use of a drug that is much feared by many practitioners and, consequently, when employed by the majority of men, is used in insufficient quantities to produce the physiological effects and is, therefore, declared useless by them. I refer to veratrum viride. Another reason why many physicians do not obtain the desired results from this drug is that they use it simultaneously with morphine. I want to emphasize as strongly as possible, that morphine is the physiological antidote of veratrum viridi. In a robust woman it is usually not worth while to begin with a dose of less than 30 minims and 10, 15 or 20 minims more are to be given at one half-hour intervals until the pulse is brought down to 70. I do not claim that this will relieve every patient, nor do I know any other one treatment that will do so. It is particularly indicated in those cases in which the pulse is full and bounding. As the late Dr. A. B. Isham of Cincinnati pointed out, it not only produces its well-known effect on the circulation, but is a diuretic and causes the liver to pour out large quantities of bile; therefore, it is one of the best agents known to increase elimination.

In a paper by Dr. James J. Hogan, of San Francisco, published in the *California State Journal of Medicine* in Feb., 1915, the value of

alkalies as a prophylactic measure and the use of Fischer solution as a method of treatment is clearly stated. It cannot be claimed that this method will save every case, because sometimes the kidneys and liver have already been irreparably damaged. But the value of keeping the urine alkaline in reactionas a prophylactic measure I do not think can be overstated. The indication undoubtedly is to eliminate the poison and veratrum with purgation and the use of Fischer's solution appear to meet this indication better than any other means at our disposal.

If these comments on the present tendencies in the practice of gynecology and obstetrics have furnished you some food for thought my object in presenting them will have been accomplished.

FURTHER EXPERIENCES WITH LOCAL ANESTHESIA IN HERNIOTOMY.

BY

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At the Providence meeting of this Association in September, 1913, I reported twenty-eight operations for the radical cure of inguinal hernia performed under local anesthesia. This paper was published November, 1913, in The American Journal of Obstetrics and Diseases of Women and Children. Since that time I have performed ninety-six additional operations by the same method. The following is a tabulation of all operations:

97 operations for radical cure of inguinal hernia.
6 operations for radical cure of strangulated inguinal hernia
7 operations for radical cure of femoral hernia.
5 operations for radical cure of strangulated femoral hernia.
3 operations for incarcerated femoral hernia.
2 operations for incarcerated umbilical hernia.
5 operations for incisional hernia.
Total 125. There have been no deaths.

My further experience with this method of performing herniotomy has convinced me that, whenever possible, such operations should be performed under local anesthesia. The only exception to this rule should be in case of herniotomy in children and where the operation must be performed in uncontrollable nervous adults. The latter exception in actual practice is not as frequent as one would think, for the reason that most nervous individuals can be controlled by carefully explaining to them the nature of the operation and the reasons for operating under local anesthesia.

A preliminary hypodermic injection of morphine and scopolamine or pantopon and scopolamine is usually sufficient to allay all nervousness and the operation can proceed even in nervous patients with the same facility as under general narcosis. In only three of the operations herewith reported was it necessary to complete the operation with a slight amount of ether; these were among the earlier operations.

Local anesthesia recommends itself for hernia operations because it insures the patient absolute safety. No other form of anesthesia

gives the same degree of safety as does the modern Braun technic of local anesthesia. When a surgeon has mastered the few principles which are necessary for success in local anesthesia he will soon abandon all other anesthetics in herniotomy.

The objections which have been raised against this method have been:

1. Psychic disturbances.
2. Pain during the operation.
3. Inability of the surgeon to do complete work.
4. Greater danger of infection.
5. Prolongation of the operation as compared with general anesthesia.

1. As to *psychic disturbances*, in my experience, this has been a negligible quantity. Some of the patients have been nervous at the outset of the operation, but I found when the various steps have been previously explained to them and when they are told the truth regarding the amount of pulling which they will experience during the operation, they are satisfied and the operation is performed with no particular difficulty. I found that preliminary hypodermic injections of morphine and scopolamine help in such patients who seem apprehensive of the operation. The routine administration of preliminary hypodermic injections, has been abandoned. I found them unnecessary, the local anesthesia being of sufficient intensity to preclude their use. I have never observed any serious psychic shock during these operations; the pulse rate usually remaining the same as it was before the operation began.

2. *Pain during the Operation.*—A greater familiarity with the method enables the operator to thoroughly anesthetize the parts and the operation may be completed without pain. A freshly prepared solution; a thorough injection about the site of operation; a wait of ten to fifteen minutes after the injection; some care in handling the tissues together with supplementary injections in the subperitoneal space around the neck of the hernial sac will render the operation painless. Sometimes a little pain is experienced when an intestinal adhesion to the interior of the sac is encountered. Such adhesions can be separated without pain by supplementary injections and care in dissecting them free. To my mind the best evidence that these operations are done in a painless manner is that one patient will send another for the same operation.

3. *Inability of the Surgeon to do Complete Work.*—This factor depends entirely upon good anesthesia. A patient who is only partly anesthetized, because of imperfect technic, will not allow satisfactory work. In my experience, owing to the relaxation of the muscles and fascia, more satisfactory work and better dissection may be made than under general anesthesia. To get the same degree of relaxation under general anesthesia, it is necessary to have the patient profoundly under the influence of ether. In my experience this relaxation has been so great under local anesthesia that it not only permits of the most thorough work, but it also facilitates a most extensive overlapping of the external oblique fascia. I have, therefore, gained the impression that recurrences after such operations are less frequent than under general narcosis.

Thus far in my series of cases I have had no recurrences of the hernia. In thirty cases more than two years have elapsed since the operation. The number is, of course, too small, and the time since operation too short, to form definite conclusions on this point. Sufficient time must elapse in a larger series of cases before this can be demonstrated; nevertheless, one cannot resist this impression after operating upon a series of hernias under local anesthesia.

4. *Greater Danger of Infection.*—Danger of infection depends upon the sterility of the solution, and the method of injection employed. The solutions can be rendered sterile by boiling. Such solutions should be made from the novocain crystals in salt solution and boiled for three minutes. The adrenalin should be added just before the solution is removed from the flame. Solutions prepared in this way are always sterile and do not irritate the tissues. With the Brauhnn technic the infiltration, the barrier of anesthetic solution, surrounds the field of operation and the incision does not go beyond the infiltrated areas as is the case when the Schleich method is employed. There is more danger of infection and necrosis of tissue with the Schleich technic than with the Braun method.

I have had only one infection, this was due to faulty preparation of the solution.

5. *Prolongation of Operation.*—It has often been said that herniotomies performed under local anesthesia consume more time than when such operations are performed under general anesthesia. This may be true of the Schleich technic. With this method it is necessary to infiltrate the successive layers of tissue before incising them, all of which takes considerable time. With the newer technic the injection and anesthetic effect take less time than is required to put the patient asleep with ether. Regarding the time

consumed in the operation, there is no difference between local and general anesthesia.

The method of injecting these solutions consists in using two points for the entrance of the needle. The first one opposite the anterior-superior spine of the ilium and the other about an inch above the spine of the pubes for inguinal hernia. These two points are rendered insensitive by the intradermal injection of some of the solution with an ordinary hypodermic needle. Through these two points the solution is deposited by the aid of syringes having a long needle attached at right angles. The field of operation is surrounded by the solution first under the superficial layers and then under the deeper external oblique fascia. Of late I have also placed some of the solution under the skin along the line of incision. This somewhat shortens the period of waiting after the injection is completed. I have entirely abandoned the separate infiltration of the inguinal nerves as was done in the earlier operation. These nerves seem to be sufficiently anesthetized when some of the solution is deposited under the external oblique fascia opposite the anterior-superior spine of the ilium. In large scrotal hernias some of the solution is injected downward into the superficial layers of the scrotum. In femoral hernias the inguinal method has always been used and the infiltration is made just the same as for an inguinal herniotomy.

I have never observed the slightest toxic effect from the use of the ½ per cent. novocain and adrenalin solutions which I have employed for these operations. In one double hernia operation I used 12 ounces of the solution. The average amount of solution employed is from 3 to 6 ounces, depending upon the size of the hernia and the amount of superficial fat present. An accurate hemostasis is essential to success, and all pouting vessels should be immediately ligated after the skin incision is made. When this is done the danger of secondary hematoma is eliminated.

Statistics regarding the frequency of hernia show that the condition is very common. According to Coley, who (Keen's Surgery, vol. iv) quotes Malgaigne and Werkner, one out of every twenty-one subjects examined in Saxony had a rupture, while the proportion in Belgium was one in every eighty-nine. Berger estimates that the proportion of ruptures in males is 1–14.9 and in females 1–44.7. He gives the average as 1–22 in both sexes. These studies also showed that there was a steady increase in males in the number of hernias during the active period of life, from thirty-five to seventy years. The number of operations which are performed in our

hospitals do not in any way equal the number of hernias which should be operated. Mortality statistics show that deaths from strangulated hernia frequently occur.

Total deaths from hernia in the United States were as follows: 1910, 2192 of which 1142 were males and 1050 females. 1911, 2369 total of which 1265 were males and 1104 females. 1912, 2348 total of which 1222 were males 1126 females. 1913, 2424 total of which 1263 were males 1161 females.

The mortality rate per 100,000 is as follows: 1901–1905, 4.02; 1906–1910, 4.01; 1910, 4.01; 1911, 4; 1912, 3.9 and 1913, 3.81.

The frequency of hernia in otherwise normal individuals should make it the most common of all surgical operations. This will only be the case when the entire medical profession will give these patients a method of operation which involves no danger to life and which gives a maximum of cures. These conditions are at present best fulfilled, by the use of local anesthesia in such operations.

DISCUSSION.

Dr. John W. Keefe, Providence, Rhode Island.—My experience is in accord with that of Dr. Jacobson. I began this method of anesthesia in cases of hernia at the time Dr. Cushing, quite a number of years ago at the Johns Hopkins, first spoke in detail of performing hernia operations with the aid of cocain anesthesia, and injecting the ilio-hypogastric and ilio-inguinal nerves. I have done a number of hernia operations with the aid of local anesthesia, and in recent times I have been using morphia and scopolamin previous to using the cocain and adrenalin. I found in certain cases scopolamin seemed to make the patient so excitable that in a few instances I had to put off the operation to another day. It may be, that was due to some idiosyncrasy on the part of the patient, but I have been firmly impressed with this way of anesthetizing the patient for an operation for hernia and believe it is a most desirable method.

I recall a very slight anemic, timid sort of man, concerning whom one would say ordinarily, that he could not stand very much, and after telling him I thought he would suffer no pain with local anesthesia, I was able to do a hernia operation on him with very little disturbance. He had taken ether before for some other operation, and some years afterward he told me that there was no question whatever but that if he had an operation to be done again, that is, for a hernia, he would select a local anesthetic. In every case of strangulated hernia a local anesthetic should be used. Most of the operations for inguinal hernia should be done under local anesthesia. If I were to have an operation on myself for hernia, I certainly would select a local anesthetic, judging from my experience with it.

Dr. Albert Vander Veer, Albany, New York.—In a deliberate operation for the relief of hernia, I cannot help thinking what a change has taken place in the professional atmosphere. Looking

back to the days when operation for strangulated hernia was the only treatment we could advise for the relief of this condition, and how satisfactory is our present method of cure, carrying but a slight mortality, because of the great advance made in our surgical work.

We have gradually reached a point, when the majority of the profession are in favor of local anesthesia, and yet, at the same time, the subject is not quite settled requiring further consideration not only from our state but national associations.

Dr. Jacobson brought out a number of interesting points in his paper. I am glad to have him assert himself in regard to children. I do not believe local anesthesia appropriate for children. I was glad to have him say it is not absolutely necessary to select the ilio-inguinal nerve itself for the injection. I wish to impress this point: In all our operations we have to deal with patients, intelligent or otherwise, and this is an operation concerning which we can say to the patient, do you select a local anesthetic or do you prefer to take a general anesthetic? Do you prefer to be under the influence of an anesthetic so that you will know nothing about what is going on in regard to the operation? There are a number of individuals who make better patients by following out their desires. A nervous patient will select a general anesthetic, and will do much better, and it will be better for the operator.

One may say that it is very trivial for me to take your time to speak about the instruments, but it seems to me, that simplicity holds good. We have a variety of syringes that have been suggested for local anesthesia, and I am convinced that a plain glass syringe, with glass piston, with a point long enough and imitating that of the ordinary hypodermic syringe, is the safest instrument for us to use. The doctor may have had greater success than I, but it has been to me a source of disappointment to see the best of our nurses unable to take care of trocars and keep the syringes in good condition. I feel that the simplest instrument I can have, one that can be sterilized and put in good condition before the operation so that when it comes into my hands, I know and feel sure it is going to work, is the instrument to use. There is no disappointment about it. While this is a beautiful instrument to look at, and very much like others, I hope the doctor will not be disappointed at any time in finding it not in good condition.

As one of the older members of the Association, I am glad to be with you to-day. I am pleased to notice there is such an amount of vigor, vim and earnestness manifested. I am profoundly thankful that such an organization as this has existed for the past quarter of a century. As I look over my library I notice the number of volumes that this Association has produced. I remember them very distinctly. I feel a sense of gratitude to know that there is contained in them a vast amount of interesting and instructive literature, and I look to you gentlemen with great pleasure because your work has been recognized in the various medical journals, and particularly in the journal that gives you official recognition by publishing your papers and discussions, I believe that you will go on and solve the

unsolved questions before you, and I wish you all success in the work you are doing. (Applause.)

Dr. William H. Humiston, Cleveland, Ohio.—I was much interested and gratified to listen to Dr. Jacobson's paper, and anyone who has seen him operate under local anesthesia will come away convinced that he is a master of that art. I think I was one of the pioneers in local anesthetic work. Some thirty years ago I did a great deal of minor work in gynecology under cocain anesthesia. I published my paper at the Washington meeting of the American Medical Association some twenty-five or thirty years ago.

In following an exclusive method of anesthesia, I think one is inclined to make every case submit to that form. I found out that when I was inclined that way I was using poor judgment many times. You must select your cases. A nervous run-down woman, although she does not suffer pain, mentally suffers, and makes a fuss all the time, so that it is not a favorable situation for the operator to be in, in order to do good rapid work. These cases should be selected very carefully. We had a good many disturbances of respiration and circulation, and the nervous system was slow in recovering from these local anesthetic operations, but as soon as we recognized individual difference, and selected our cases and used a general anesthetic when indicated, we had better results.

Of course, we used at that time cocain and not the present method of novocain. We used a 4 per cent. solution which sometimes would give us disturbances of respiration and very rapid heart, but I soon learned to control that by giving half an ounce of whiskey and $\frac{1}{30}$ grain of strychnine half an hour before the operation. I gradually reduced the strength until we were using 1 per cent. solution. After adopting the 1 per cent. solution we did not have these symptoms or disturbances follow the injection of any reasonable amount of the anesthetic. We were able to do, and still do, in cases that are suitable, curetments, trachelorrhaphy, and perineorrhaphy under local anesthesia, but I only use it in about 40 per cent. of my cases. For the other cases I think a general anesthetic is preferable.

Dr. Jacobson (closing the discussion).—There is very little to add to what I have already said. I have taken up and answered most of the questions in the paper. I do not think we ought to speak of local anesthesia without meaning the modern technic of Braun. We ought to eliminate cocain entirely on account of its danger. When one becomes familiar with the Braun method, it will prove to be a great source of satisfaction.

My plea to-day is that more cases of hernia should be operated upon, as we can now assure such patients absolute safety in operations. There are many more cases of hernia walking the streets than are operated. When this is thoroughly understood by the many who wear trusses, and who are usually the active wage-earners of the country, they will gladly submit to operation, and in this way many deaths can be prevented and the usefulness of these people increased.

Regarding the syringe which I have exhibited, while I think a glass and metal syringe is much nicer owing to the fact that you can see the solution during injection, yet this is not an essential part of the technic. My syringe can be boiled with the instruments and will not break. If it does break or wear out, you can buy a new one for what it costs to repair one of the glass syringes.

REPORT OF A CASE OF A GALL-STONE CAUSING INTESTINAL OBSTRUCTION AND VOLVULUS.

BY

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Cincinnati, Ohio

(With one illustration.)

I REPORT this case to place upon record the history of a patient who had gall-stones for a period of eighteen years. There were few symptoms during this period which could be regarded as at all serious until the last. The symptoms began three months before death, the attack ending by a stone finding its way into the small intestine, causing obstruction and this, in turn, caused volvulus.

To men engaged in abdominal surgery, as the members of this Association are, I would not presume to make any suggestions regarding the early management of diseases of the biliary passages. I desire, however, to remind them of the necessity of always being upon the alert in this class of cases. These patients and, especially, their family physicians must be warned and reminded of the many dangerous complications that may develop in any of these cases. This case may emphasize the danger of delaying operation and serve to point the way to how a fatal termination in long standing gall-bladder diseases may be avoided. This campaign of educating the profession is necessary because a large number, if not the majority, of them treat these cases medically and advise against surgical intervention. The case to be reported illustrates in a forceful manner that all gall-stones cases are serious in character as long as the patient carries the gall-stone, even though patients do not have frequent attacks of pain.

It is very unusual for a gall-stone, the size of this one (almost egg-shaped, 2¼ inches long, 1⅛ inches in diameter; the long circumference 5½ inches, the short circumference 3½ inches), to find its way into the small bowel and cause intestinal obstruction. There are a number of cases reported in which a large gall-stone has entered the bowel and caused obstruction. This complication develops, usually, a long time after the acute symptoms, produced by the gall-stones, have subsided and the cause of the obstruction is not suspected until the stone is found at an operation or when an autopsy reveals its presence.

The history of my case, beginning with the first attack following a self-induced abortion in 1897, eighteen years previous to the obstruction, is of unusual interest in view of the development of subsequent complications. After the attempt to produce the abortion, the patient became ill. She treated herself for three days, after which time Dr. F. M. Solar, of Cincinnati, was called. He found the patient had been bleeding a week. There was a foul, bloody, discharge from the vagina. The uterus still contained a portion of the secundines. Patient had fever and rapid pulse. The abdomen was distended and very tender in the region of the gall-bladder.

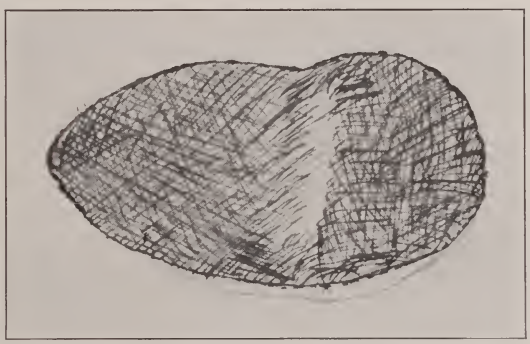

FIG. 1.—The actual size and shape of the gall-stone. The light space across the drawing represents the line of demarkation where different concretions have united while yet in the gall-bladder. The specimen is shaped somewhat like the gall-bladder which evidently had contracted over it before the stone ulcerated through into the bowel.

Domestic remedies taken to evacuate the bowels, had failed. The attending physician used various drugs for the same purpose, but without the result desired.

At the time of my first visit it was impossible to determine the cause of the obstipation. The septic condition, from the incomplete abortion was considered of sufficient importance to demand immediate emptying of the uterus. Patient was at once removed to Christ Hospital and operated upon. While the patient was under the anesthetic, she was placed in the extreme Trendelenburg position and several high enemata, through a Langdon tube, were given. This treatment was only partially successful, but brought away much flatus, which greatly lessened the abdominal distention and relieved the patient, greatly. Two days later a good evacuation was secured and convalescence established. The patient then complained of pain in the region of the gall-bladder and of soreness only in other

parts of the abdomen. When the patient was under the influence of ether, it was easy to make out an enlarged gall-bladder.

The patient made a very satisfactory recovery, leaving the hospital in two weeks. She had a healthy baby in about two years after the illness just described, and two years later another miscarriage, without complications. After the last incident, she rarely complained of more than a little discomfort from gas or indigestion. She performed her household duties, which were many and not very light.

Reviewing the history of the case in the light of subsequent developments, it appears plain that it was the disease in the gall-bladder and not sepsis from the abortion, which produced the obstipation in 1897. While, at that time we were aware of the existence of an enlarged gall-bladder, we were in doubt as to the exact cause of the marked obstipation and rather blamed the abortion for it.

The patient seemed in good health until the middle of September, 1914, when Dr. Solar was called to see her. He diagnosticated gall-stone colic and administered a dose of morphine hypodermically. The next day, he found the patient sitting in an easy chair and, aside from soreness and tenderness in the region of the gall-bladder, she said she was apparently well. From this date until her last sickness, she suffered more or less from indigestion and discomfort in the abdomen. She did not send for the doctor until Friday morning, January 1, 1915.

The patient then complained of great pain in the epigastric and gall-bladder region. She attributed this to a heavy midnight supper.

Diagnosis.—Gall-stone colic. The doctor gave a hypodermic of morphine and prescribed a dose of castor oil. The bowels did not move until Monday, January 4, 8 A. M. She then had a free evacuation. After that the bowels refused to move in spite of diligent and persistent effort to evacuate them.

January 6, at 3:30 A. M. the patient was alarmingly ill. She complained of severe pain in the abdomen. Intestinal peristalsis was marked. From this time on all of the symptoms became greatly aggravated; she suffered much and her condition was bad. The abdominal distention increased rapidly and she vomited several times during the forenoon. When the writer saw the patient at 1 P. M., January 6, the abdominal distension was enormous, pulse very feeble, skin cold and clammy, vomit had fecal odor and prostration very marked. Patient's condition was very grave. Acting upon the conviction that every patient having intestinal obstruction, and who is not in articulo mortis, should be given a chance to live by opening

the abdomen, the patient was removed to Bethesda Hospital when a celiotomy was at once performed.

Upon opening the abdomen below the umbilicus, 4-inch incision, a pint or more of peritoneal fluid escaped. The intestines were very much congested and quite dark in color. The peculiar feature was the intestinal coils were of the same shade of color. A rapid exploration was made of the appendix, hernial rings, and of the pelvic organs. Nothing abnormal was found. After that the region of the gall-bladder was explored and numerous adhesions were discovered. Realizing that we had some unusual condition to deal with, the incision was extended upward for 3 inches. The distended intestines were permitted to escape out of the abdomen, and protected by moist, warm towels. Up to this stage of the operation, no cause for the obstruction had been detected. We now found that all of the small intestine, from the head of the colon up to near the jejunum, had rotated upon the mesentery, making almost one complete turn; the head of the colon was pulled up and drawn across the middle line, making the constriction more complete. By grasping the whole mass of distended bowels, which had previously been enveloped by the moist towels, elevating and turning them toward the patient's right, the volvulus was easily corrected. During this manipulation the cause of the obstruction and volvulus was discovered. A large gall-stone was lodged in the small intestine about 18 inches from the colon. It was observed that, immediately after the intestinal mass was rotated, the discoloration of the bowel was greatly lessened. It was thought it would be an easy matter to push the stone on into the colon, where it would be quite harmless. But after it was pushed only a short distance, it became lodged and we found that it was quite impossible to push it farther, without using undue force and consuming too much time. Clamping the bowel upon either side of the stone, it was incised opposite the mesentery and the stone removed. The bowel was then repaired in the usual manner. As soon as the clamps were removed, the gas and liquid contents passed freely into the colon. Before the abdomen could be closed a large evacuation from the bowels occurred. The operation did not consume much time. From the commencement of the administration of ether, until the dressings were placed, less than twenty minutes were occupied. Great shock followed the operation. Notwithstanding our best efforts at stimulation, such as dry heat, normal salt transfusion, adrenalin and strychnia, the patient succumbed in two hours, without regaining consciousness.

There are several interesting facts to be noted in the study of this

case. From the clinical history, it is more than probable that the stone passed into the intestine shortly after the oil was administered on January 1. Because the stone did not completely block the lumen of the bowel, so as to wholly obstruct the passage of gas, well-defined symptoms of obstruction were not present during the first five days of her last illness. That the stone was gradually pushed through the intestine, aided by the various cathartics administered, as well as by the violent peristalsis, is a reasonable supposition. There were no alarming symptoms until the stone became obstructed in its passage on the morning of January 6, at which time all of the symptoms were suddenly aggravated. The patient complained of severe pain and for a short time, the most violent peristalsis prevailed. It is quite certain that the volvulus developed at that juncture; the peristalsis ceased then, and did not manifest itself thereafter. Nature's heroic effort, the violent peristalsis necessary to push forward the obstructing body, was the real cause of the fatal complication.

Again, the case is a forcible reminder that gall-stones may remain comparatively quiescent for years and be the direct cause of death in different ways. One of the causes of death from neglected gall-stones is cancer in and about the biliary ducts. I was the first to call the attention of the profession to this now well-established clinical fact, in a paper read at the American Association of Obstetricians and Gynecologists, at St. Louis, Mo., September 20, 1892, vol. v, of the *Transactions*. Infection from gall-stones, with all of its attending evils and complications, is a familiar picture to us all. The slow process of ulceration, necessary for the passage of a large stone into the bowel, is a source of very great danger to the patient, and one that would require a great deal of time to discuss; therefore, I will not consider in now. That any of these cases survive all the dangers attending this tedious process of ulceration is a striking illustration of the marvelous resources of nature.

Usually the real cause of the disease is not recognized until the stone is discharged with the stool, or revealed during an operation or autopsy. The history of a gall-stone colic of months or years ago is ignored or has been forgotten. With these facts before us, and similar cases constantly coming under observation, would it not be the part of wisdom to advise an early exploratory operation before obstruction occurs? Especially would I urge an exploratory operation in all of the cases in which there exists a distinct history of one or more accute attacks of pain referable to the bile passages. These patients are now being treated by many physicians, con-

tentedly and hopefully upon their part, with very indefinite results. The condition is variously described by such vague terms as "stomach symptoms," "discomfort after meals," "indigestion," "neuralgia," "gastralgia," "liver derangement," etc., and is treated for years by physicians, as we view it, who wait for "something to happen." If I can stimulate the general practitioners and specialists in this line to employ more advanced methods of treatment for this class of patients, I shall feel more than repaid for my efforts in presenting this case to you.

DISCUSSION.

Dr. Hugo O. Pantzer, Indianapolis, Indiana.—The very thoughtful and vivid presentation of this case brings to my mind one case which to me was very instructive. The case was reported by Dr. Elsner of Rochester, N. Y., about twenty odd years ago under the striking title "The Vagaries of a Gall-Stone." In that case a stone of similar size to that described by Dr. Hall, following a history of long-standing gall-bladder trouble was attended by attacks of acute obstruction. When finally a large stone was passed by the rectum, the riddle was easily explained. The stone in its course down the intestine would create local irritation, and within the adjacent musculature would develop spastic contraction causing temporary obstruction of the bowels at that site. Under the influence of time and medication the spasm relaxed and then the stone went farther down, again to be caught up, until finally its rectal expulsion gave relief. It occurs to me that Dr. Hall's case is unusually interesting inasmuch as it was complicated with volvulus. I believe it is about the only case of the kind ever reported. Whether this case in January had the volvulus is to me questionable in the light of Dr. Elsner's case and one similar case I had. I would rather incline to think that the cause of obstruction was somewhere higher up in the small intestine, and that it was not attended with volvulus until the stone had traversed the full length of the small intestine and approached the ileocecal valve, and that then the volvulus occurred coincidentally. My similar case was one of intussusception owing to intraileal fibroid tumor, which was reported to this meeting two years ago.

Dr. Hall.—Let me correct an impression you have. I tried to make the point that the volvulus occurred on the morning of the day of the operation, that is, five days after her illness. If Nature had not produced this great peristalsis the intestine probably would have been relieved in a few hours by pushing the stone on into the colon.

Dr. Pantzer (resuming).—I am glad to stand corrected. In my case the intussusception had existed for several days. The intussusception was a natural issue caused by the fibroid attached to the inner wall of the intestine.

Dr. Frank D. Gray, Jersey City, New Jersey.—This is a very practical paper in which the author reports a very interesting and

instructive case. There is one thing all of us every now and then learn from our own experience and observation of others, and then quite frequently we forget it over a long space of time, and that is the matter of dealing with these abdominal conditions, whatever they may be, promptly. We have pretty well learned that lesson as regards appendicitis. We are trying to learn it with reference to the malignant conditions in the abdomen, but when we come to the chronic abdomen we so often forget that it is just about as important to find out by actual exploratory operation what the trouble is as it is in the acute abdomen. If this particular case had been operated on promptly, there is no doubt that the woman's life would have been saved, and I think that the chief lesson of this paper is to pay attention, to give heed to the undoubted and persistent symptoms, go in and find the trouble and relieve it.

Dr. Francis Reder, St. Louis, Missouri.—This case is of interest from two points of view. In the first place, what a gall-stone can do, and, in the second place, the promptness with which this patient died two hours after the operation without regaining consciousness. An interesting feature is the cause of death, which the essayist attributes to the violent peristalsis. There are other factors to be considered. The principal one, I venture to say, is that of anesthesia With all due respect to the essayist, I presume it was a general anesthetic. The resisting power of this patient had undoubtedly been underestimated. This was a case for local anesthesia and for exploratory operation. We must here accept as a contributory cause of death a toxemia excited by bacteria of the intestinal tract before the operation plus a flooding of the intestinal tract after the operation by large quantities of the stagnant contents with their poisonous products.

Dr. Gordon K. Dickinson, Jersey City, New Jersey.—If 30 per cent. is our accurate diagnostic average in the abdomen, then operation should be done promptly, and more on suspicion than on diagnosis, more on opinion that something is wrong than waiting until we feel that something is positively and surgically bad. In Europe or in Mexico or in the abdomen, watchful waiting is bad policy. In going over my cases and studying them very carefully I find that death in many of them was due to dilatation of the right side of the heart, which comes on quickly after an abdominal operation, partly due to the anesthetic, and partly due to the condition of the heart. The fact that the abdomen was relieved makes me feel that possibly in this case we had a right-sided heart failure.

Dr. J. Henry Carstens, Detroit, Michigan.—When you do an operation in twenty minutes, that certainly is the best anyone can do. I agree with what the essayist has said and with what Dr. Gray has said, that we do not do these operations early enough. If we can make a provisional diagnosis and do an exploratory operation, we will never have many of these cases go to the bad.

Dr. Magnus A. Tate, Cincinnati, Ohio.—The case history Dr. Hall presented reminds me of one I saw about five years ago. A woman, about sixty years of age, had been complaining for a number

of years of pain and tenderness over the gall-bladder region. One day she was taken with severe vomiting, abdomen became distended, and I tried my best to persuade her that a section was necessary. She refused to undergo an operation. A day or two later I was called to the country to operate, and while there this patient became critically ill and passed into a state of collapse. My friend, Dr. Horace Whitacre was called to see her and he hurriedly took her to hospital and operated. He found a large stone, $2\frac{1}{2}$ inches in length and about 1 inch in thickness in the intestine some 6 inches below the gall bladder. The intestine was gangrenous and ready to burst. In making the resection a portion of the contents escaped into the abdominal cavity. The patient died about three hours after operation. This is the only case of this kind I have ever encountered in my practice and I intended at some time to make a full report of it, but the one presented by Dr. Hall was so similar in many respects to mine that I thought I would put mine with his on record.

Dr. John F. Erdmann, New York City.—One can sympathize with Dr. Hall in reference to the matter of mortality. Personally, I have had five cases of intestinal obstruction from gall-stones in the past ten years, and of this number four of the patients died. Strange to say, the recovery was in a woman, seventy-two years of age, upon whom I did an enterostomy and appendectomy. She also had a large tumor of the right ovary, which was also removed. One of the patients had a very large stone which was fully the size of a small goose egg, this patient died within six days from the time of the operation from septic peritonitis. Three of the male patients had stercoraceous or fecal vomiting. The trouble we have to contend with in connection with these cases is delay on part of the patients themselves and failure to recognize the symptoms. In other words, the three male patients whom I operated suspected that nothing was the matter with them with the exception that they were constipated, when I saw them in consultation they were having fecal vomiting and were practically moribund.

Dr. Herman E. Hayd, Buffalo, New York.—Dr. Erdmann has brought out a very important point in reference to these cases of gall-stones. I recall a patient, a woman seventy-nine years of age, who had practically no symptoms. So far as the passage of the stone is concerned, she never had an attack of violent pain, and yet the stone was as large as a small hen's egg. I was called to see her when she was having stercoraceous vomiting. She continued to vomit for two days, would not let me operate at that time, but finally I persuaded her to be operated on, she gave her consent, and died of pulmonary edema two days after the operation. These cases in old women either show how patulous or dilatable the ducts become, so that the stone passes through or do they always ulcerate through. There was no history of ulceration, such as pain, nor of an inflammatory attack. The stone was found in the bowel and the symptoms were those of intestinal obstruction.

Dr. Albert Vander Veer, Albany, New York.—There are two or three points brought out in connection with this subject that are

exceedingly interesting and impressive. In my collection I have a specimen which I secured many years ago that impresses me very much now as it did at that time. A patient, whom I had attended some fifteen years previously—one of my first cases, in a rather prominent citizen—was taken very ill with an acute attack of jaundice, due, as we believed, to an obstruction of the common duct, by the passage of a gall-stone. He recovered from this illness and lived many years afterward in good health. At the time of his death I was permitted to hold an autopsy, finding a direct communication between the neck of the gall-bladder and the beginning of the transverse colon, due to ulceration, the formation of adhesions and a fistulous tract leading to the large intestine. I believe this man, in his previous illness had passed through a stage whereby the gall-bladder was relieved of gall-stones, and they had passed out to the large intestine.

At about this time I was called to see another patient, who was suffering from very much the same symptoms. She was the wife of one of our leading masters in dancing; she did a great deal of dancing and believed this form of exercise contributed to her attacks of biliary colic. Her last attack was very much like the case to which I referred. Years afterward she passed what we called a gall-stone, brought it to me, and I still retain it in my collection. It was nearly the size of the one Dr. Hall has spoken of. I cannot believe it passed from the gall-bladder into the intestine that size, but belonged to a class we call enteroliths, with a small gall-stone as a nucleus.

Dr. Hall reports this as a gall-stone. Two or three other cases have been reported here as gall-stones. I have always used this as an argument with patients: You suffered one, two, possibly five years ago from an attack of what was supposed to be gall-stone colic; you may have passed a gall-stone into the intestinal tract; you are now suffering from symptoms that make us believe you have some obstruction of the intestinal tract due to the original gall-stone which has now become a large mass. I believe these are true enteroliths. These are not passed into the intestinal tract when they are of that size. They must enlarge somewhat; some additional concretion may take place, and we can use this as an argument: that not only do gall-stones produce malignant disease, but if they are allowed to remain in the intestinal tract they are largely an element of obstruction, and patients ought to submit to an operation. I have seen cases where we had reason to believe the former trouble was now leading to more serious disturbances.

Dr. Hall has brought out an excellent point in regard to the mortality. Any form of obstruction, whatever it may be, may produce this condition of volvulus. Any condition that will produce a tendency toward a portion of the intestine to twist upon itself, so that the mesenteric veins are involved, will bring about a condition of shock from which we must expect a large mortality. These patients do not rally well from operation afterward; many of them die in the acute condition.

Dr. Erdmann has given us a report of several cases with the fatali-

ties. I wonder to-day how many cases we are getting in which the intestinal obstruction is due to gall-stones passing into the intestinal tract and there producing a form of obstruction.

There is one point Dr. Hall did not bring out, and that is these large enteroliths will permit the escape of gas and liquids. They are proper cases for exploration without doubt. We do not see as many cases as we did thirty years ago because people are now willing to undergo operations at once for the relief of gall-stones. Dr. Hall has been one of the pioneers in that direction and we are indebted to him for reporting these cases and making use of them to impress upon patients who have gall-stone colic the necessity of operation and the great danger to which they are exposed in allowing a conditon of this kind to go on.

Dr. Charles L. Ill, Newark, New Jersey.—Some thirty years ago I saw my brother do a postmortem on a patient who died from an obstruction of the bowels. In this case we found a mass between the small intestine and the gall-bladder. Three large gall-stones passed through the ulceration into the intestine, caused obstruction, and killed the patient.

In a second case, a woman who had an obstruction of the bowel, and we were not able to get a history of gall-stone at the time. She had a large stone in the ilium near the ileocecal valve. It gave her a complete obstruction. She was in bad shape. The appendix was adherent near the seat of obstruction. I loosened up the adhesions, pushed the stone into the large intestine, sewed up the patient and she got well. She passed a stone two or three days later. In a third case, where we were scarcely able to make a diagnosis from the history, the woman was suffering from symptoms of obstruction. I operated, opened the intestine and took out a large stone. This patient recovered. I do not quite understand how we are going to make an early diagnosis in these cases for the reason that they come to us in the last stages. If we had these cases earlier or had them under observation in the hospital a diagnosis would be more likely.

Dr. D. Tod Gilliam, Columbus, Ohio.—Gall-stone obstruction of the intestinal canal usually occurs at some point well down toward the ileocecal valve. This because the lumen of the gut gradually diminishes from above downward and the stone eventually finds a place where it cannot pass through. If it should be able to pass the ileocecal valve it finds easy passage through the colon and escape unobserved. Obstruction in the region of the ileocecal valve will give rise to great abdominal distention. As one of the most frequent causes of obstruction in this vicinity aside from ileus is the enterolith or gall-stone it follows that intestinal obstruction with great abdominal distention, especially in old people should always suggest the presence of gall-stone or enterolith.

Dr. John Norval Bell, Detroit, Michigan.—Dr. Hayd asked the question, how do these large stones manage to get into the bowels. The case I had will perhaps el ucidate that in a measure. A woman, sixty-seven years of age, who had never had any pain, but simply

heaviness and fullness, had a palpable tumor of good size, but it was hard to determine the nature of it. On opening the abdomen, I found it was a large thickened gall-bladder full of stones. There was one stone four times the size of the one Dr. Hall has described. Between the gall-bladder and the colon were several cribriform openings, some large enough to insert the little finger, showing how nature was endeavoring to ulcerate that adherent wall to make an opening and force the stone into the bowel.

Dr. William Edgar Darnall, Atlantic City, New Jersey.—The question arises: What is the character of these stones? I was talking to my friend Dr. Hayd about a woman from California who underwent an operation. In this case the surgeon inserted his finger into the rectum and pulled out a gall-stone that was very large, too large to be contained in any gall-bladder.

How much of these obstructive gall-stones is actually gall-stone, and how much is due to enterolith accumulation?

I recall a case I saw a year or two ago on which I operated. The diagnosis was appendicitis with all of its symptoms, but when we got inside we found a little puddle of pus and fished out a stone about the size of a goose egg. The shell was one-eighth of an inch thick, and composed of hard calcium salts. That enterolith, which it was undoubtedly, contained several accumulations of bile salts.

What is the composition of these large stones?

I recall another case I had a few years ago in which there was a stone the shape of the gall-bladder which filled up the whole gall-bladder. This stone was made up entirely of calcium salts, except at one end of the stone there was a small accretion of bile salts, the balance of the stone was crystalline and made up of calcium salts, very hard, as hard as a rock. I do not recall ever having seen such a stone except in that one case, and I should like to know the experience of the fellows as to the percentage of calcium stones found in the gall-bladder.

Dr. Hall (closing).—I have been very much gratified that my paper has elicited such a free discussion, and from the discussion we have had I want to say that I do not feel at all inclined to apologize on account of the death of my patient. We, as surgeons, take cases of intestinal obstruction as we get them and not as we would like to have them, and if a patient is not dying, it is our duty, not always our pleasure, to give that patient the last chance of his or her life. This patient would not have recovered under local anesthesia or any other form of anesthetic. In fact, she was very much better while she was on the operating table than at any time before or any time after. She had gas-ether anesthesia. She had a few whiffs of gas and then ether. Her pulse was much better, and her general condition much better while she was under the influence of the anesthetic. It stimulated her. That is my experience with ether. It stimulates these patients in a short operation like that. When I put the patient under the influence of the anesthetic I thought, that I would for the time being open the intestine and do a secondary operation a few days later, but there was no place to stop at. I hoped

to make a short operation simply draining the intestine. A vast number of these cases come to us after having gone the rounds of doctors and have been treated for stomach trouble, dyspepsia and so on. I have for many years made a question-mark after my diagnosis of gall-stones, urging an exploratory operation. It usually ends by removing the gall-stones or the gall-bladder, sometimes doing a gastroenterostomy. But usually it is a gall-stone or gall-stones back of the symptoms and the diagnosis can generally be made. The average patient will now undergo an operation when you tell her she has gall-stones. They are ever ready to take your advice to resort to an exploratory operation. There are plenty of such patients that ought to be operated on.

This process of emptying the stones into the intestine is a very slow one. It is an ulcerative process. These stones find their way through into the intestine by ulceration. This stone fitted the contracted gall-bladder. The stone is formed by many small stones, the various stones are glued together. This stone is not an enterolith but a true gall-stone and it ulcerated its way through into the small intestine. I have operated several times and found a stone almost through the gall-bladder on its way to the intestine.

Away back in 1888 I was asked to see a prominent physician about my own age. He had been sick a long time. He had an enormous mass in the region of the gall-bladder. I urged an operation. I was pushed out of the case immediately and was not allowed to come back. He did not want to undergo an operation. He convalesced slowly. He went to Florida, and the stone passed into the intestine and he brought it back for me to see. He made a beautiful temporary recovery. This patient was one of the best known practitioners in Cincinnati; he practised medicine for years afterward, and ten years ago he began to complain of stomach symptoms. He would not be operated; for many weeks there was little food passing out of his stomach and finally he died, a year or two ago. He would not undergo a gastroenterostomy nor would he have any kind of an operation. There was agglutination of the stomach and intestines in the region of the gall-bladder where the stone had ulcerated through. The history was typical. We all see such cases. When a stone goes through in that way and the patient lives, that patient does not get well, he or she may improve for a while, but they have trouble subsequently.

CHOLECYSTECTOMY VERSUS CHOLECYSTOSTOMY.

BY

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INNUMERABLE controversies have been waged over the comparative merits of cholecystectomy and cholecystostomy in the treatment of gall-bladder disease. It is not my intention to review the history of these differences of opinion nor to tabulate the arguments that have been advanced by the opponents and the exponents of each operation. Any up-to-date text-book supplies this want with sufficient accuracy and fullness. I shall present for discussion simply a brief outline of the operative work I have done and its results. Wherever there might be room for a difference of opinion on the treatment adopted, I shall give a short *outline* of the reasons which influence me in the selection of the particular operation chosen.

In considering any form of surgical intervention two points must always be borne in mind; first, the primary and secondary mortality; second, the subsequent health of the patient. It is little satisfaction to the surgeon and his patient if, because of the latter's death, a permanent cure of his illness is not obtained. On the other hand, there is not much more room for glory if a patient recovers from a surgical operation only to realize that he still suffers, and continues to suffer, as before. In other words, the operation, undertaken for his cure, was ineffectual and the postoperative state of the patient is worse than ever; or, if not worse, it is no better. From the patient's standpoint the operation has been a complete failure.

For the simple reason that primary and secondary results are better, removal of stones from the biliary ducts before infection has occurred to alter these passages and to cause upper abdominal distortion by the formation of adhesions, is one of the simplest, safest and most satisfactory operations known to surgery. But it is an operation which the surgeon has all too few chances to perform. Practically, every operator would content himself with simple drainage in such a case.

Unfortunately our gall-bladder cases are seldom so simple. They usually present themselves for operation with symptoms dating back months or years. The pathological condition has spread to the

surrounding viscera by various routes of communication. In such cases one has to select the operation which not only relieves the original focus of disease, but which takes into consideration the surrounding pathological conditions and the possible subsequent developments, and which will leave the neighboring organs in a condition best calculated to enable them to regain their normal functions. It is in these cases then that we must consider the relative merits of cholecystectomy and cholecystostomy.

The results here presented are based on all the operations I have performed in the upper abdomen where there was, primarily or secondarily, any implication of the gall-bladder and bile ducts. I have performed 2600 such operations. In common with most operators of experience, my mortality has been due in nearly every case to the complications attending the original disease. Everyone realizes what an important bearing on prognosis the presence or absence of adhesions, hepatic or common duct disease, involvement of the pancreas, etc., have.

No absolute rule can be laid down to guide the operator in determining when cholecystectomy is preferable to cholecystostomy; yet there should be some way of ascertaining why there is so much higher percentage of cures after removal of the gall-bladder than after drainage. From the former cases, in the patients who survived operation and answered our inquiries, we get a report of 96.8 per cent. of cures; the remainder suffered from symptoms probably indicative of associated gastric or pancreatic disease. On the latter cases, in cholecystostomy, there were only 74.8 per cent. of cures, the remainder being no better, and many of them worse, than before operation. In considering the latter cases it is, of course, true that in many of them the disease was so advanced and adhesions so extensive that removal of the gall-bladder was out of the question because of its higher mortality of cholecystectomy under conditions like this. There are still a large number of cases where it seems to be reasonable to suppose that better permanent results might have been obtained by removal of the gall-bladder than by simple drainage. This argument receives verification from the results obtained in the two-stage operation where, for some reason, we decided to drain the gall-bladder in the first operation and then remove it in a secondary operation four to eight weeks later.

The question is how to decide definitely between these two operations. It is, too, a question of mortality, which is slightly higher in cholecystectomy than in cholecystostomy, 2.3 per cent. as compared to 2.5 per cent. In the former the mortality is kept down by

choosing the drainage operation wherever conditions indicate increased risk from removal of the gall-bladder. The dangers of cholecystectomy include the possibility of injuring the ducts, vessels and surrounding viscera from the manipulations necessary to free the adhesions.

Another argument urged against cholecystectomy, is the removal of the most valuable landmark should subsequent operation on the ducts become necessary in consequence of obstruction due to stricture or stone. While this is true in certain instances, it also furnishes an argument in favor of early and complete operation when removal of the diseased area will preclude the possibility of these sequelæ. An early and radical operation is the best argument against this eventuality; and this more than anything else, guides me in choosing the operation best suited for the individual case. Cases where the disease, while confined to the gall-bladder still, has shown, or is showing, a tendency to invade the surrounding organs are, I believe, the cases for primary cholecystectomy. This operation offers the best chance for a permanent cure.

When adhesions are so extensive that the removal of the gall-bladder would be attended with marked traumatism and leave large areas of raw surfaces to be covered, then, because of the high primary mortality and the little hope that subsequent complications will not arise, I believe better results are obtained by drainage of the gall-bladder. While I believe that a diseased gall-bladder, like a diseased appendix, should always be removed when possible, I recognize the fact that there are exceptions. One exception I have already mentioned; another is when the common duct is full of stones. In these instances I drain through the cystic duct or gall-bladder and close the opening in the common duct.

This leaves for discussion those cases where acute infection is present, and those in which there is marked jaundice from obstruction. In the latter the simplest operation, one consistent with re-establishing the flow of bile through the common duct, is the one of choice. Removal of adhesions and diseased areas should be dispensed with. Every step in the operation should be made subservient to the one purpose: Overcoming the obstruction. After the re-establishment of the biliary circulation and the recovery of the patient from the jaundice, the subsequent course should be determined by the symptoms. Whatever the symptoms may be, the condition of the patient will be so improved that any subsequent operation carries, proportionately, much less risk. The drainage instituted at the first operation will have caused great improvement

in the field of operation and justifies the expectation of a permanent cure from the second surgical intervention.

I have already referred to the two-stage operation; its field of usefulness is most marked in acute infection of the gall-bladder or upper abdomen. Because primary removal of the gall-bladder opens up so many tracts for the possible extension of infection, and because experience has shown that, occasionally, a patient does die from acute sepsis in infections of this kind, I am convinced that, in presence of this condition, the gall-bladder should be drained with as little manipulation as possible. Then, at the end of four to eight weeks, even if recovery is apparently complete, the gall-bladder should be removed. These are the patients that are left with a chronic infection which advances so insidiously that years may elapse before there is a return of the symptoms; but when they do return the involvement of structures in the upper abdomen is, frequently, too extensive to permit complete removal of the gall-bladder and to secure an ultimate cure. In these cases the diseased areas also offer favorable fields for subsequent development of malignant degeneration.

In advocating cholecystostomy in infection cases I do not mean to include hydrops and chronic empyema of the gall-bladder in a quiescent state. Cholecystectomy is safe procedure where the infection has ceased to be active.

I wish to refer to one other type of case where, I firmly believe, cholecystectomy offers the only hope of permanent cure. I mean those cases in which the bile is thickened and inspissated and, usually, unassociated with the presence of stones. This condition indicates disease of the gall-bladder, and there is every reason to believe that a diseased gall-bladder is never regenerated and so, like a diseased appendix, should always be removed when its removal is not associated with too much danger to the patient.

In these days, because of the frequent involvement of the pancreas in diseases of the gall-bladder and bile ducts, prolonged and even permanent drainage of the biliary system is often advocated. Because of the popular tendency to pay so much attention to prolonged drainage, another equally important point is overlooked. I refer to the exhausting effects and dangers occasionally observed in abdominal drainage. In the literature little, if any, mention has been made of the deleterious effects of *too prolonged abdominal drainage.* While this point is, undoubtedly, well understood by operators of experience, it seems to me it should receive more attention. My own practice is to remove drainage early in any patient slow to react from an abdominal operation. I never leave gauze in the abdomen longer than

twenty-four hours. When the pancreas is involved, I drain the common duct with a rubber tube which is never left longer than six or seven days. When possible, instead of draining through the common duct, I drain through the gall-bladder or cystic duct and close the opening in the common duct. I believe this is long enough to drain for pancreatitis when drainage offers any hope of cure, and it minimises the possibility of fistula formation which is so exhausting to the patient, occasionally even causing death.

DISCUSSION.

Dr. John F. Erdmann, New York City.—Last year I presented to the meeting of the Association at Buffalo three hundred and some odd cases of gall-bladder operations, with a mortality rate that to me was rather pleasing. I am speaking of the mortality rate in association with the mortality rate presented by the author of this paper. In my last series of cholecystectomy there was a mortality of about ¼ per cent. less than in cholecystostomy. In the main I agree with what Dr. Swope has said.

As to the question of cholecystectomy *versus* cholecystostomy, let me say that in these days of activity, efficiency and morbidity are the things all of us should consider beside reducing the mortality to the lowest point.

Recalling the paper of Dr. Moots last year, one cannot but feel that any operation which will lessen the morbidity is the operation *per se*. Anything that will increase efficiency must of necessity decrease morbidity. Cholecystectomy without any question limits morbidity and increases efficiency. In other words, when cholecystectomy is performed the patient is out of bed in from ten days to three weeks, and ready to go to work in three to five or six weeks later. When cholecystostmy is done he is not out of bed in that time, but wears a drainage tube or has a leakage from three weeks to months depending upon his condition. The morbidity of cholecystostomy is then protracted in direct relation to the convalescence. There remains frequent secondary trouble in the gall-bladder which will call for drainage, or the patient may escape from your observation and you cannot do a secondary operation. Such a patient has a lingering convalescence or prolonged morbidity. Even then he is not well. He comes back to you with a belly ache or complains of gas pains or he has an atrophied gall-bladder or adhesions or cholecystitis. A stone may be left in his cystic duct and he has got to go through the same trouble again and he is limited as to efficiency to a profound degree.

As a result of my statistics last year I have been doing cholecystectomy practically in every instance. Of course, there are cases in which we must do cholecystostomy and not cholecystectomy. Why do I do cholecystectomy now more frequently than I formerly did? Because I find my mortality is less with increasing efficiency and decreasing morbidity, so that it is now an operation of choice.

Only two weeks ago I opened the abdomen of a patient and found a double perforation of the gall-bladder. It looked suspicious. I sent the specimen to the pathologist and his report stated it was an inflammatory condition only. I requested him to make a second examination. He did so and reported apologetically adenocarcinoma.

In regard to the landmark of the duct, some ten years ago I was unfortunate in being one of the earliest men to advocate cholecystostomy *versus* cholecystectomy, owing to the fact that we might lose the anatomical landmark of the duct. I do not believe that nowadays.

As to the two-stage operation I do not believe I have done it more than twice in seventy-five or one hundred cases. I take the gall-bladder out, leave in gauze drainage for the first forty-eight hours to four or five days, depending on the intensity of the infection.

In regard to prolonged or acute drainage of bile as I prefer to call it, Dr. Gordon Hayd, my assistant and myself have seen in the post-graduate school three successive cases in a state of profound collapse at the end of forty-eight hours as the result of absolutely acute drainage of bile. There is in these cases a rapid loss of lime salts and of fluids in the system. In these cases, wherever prolonged drainage is needed we are prone to pinch off the tube if it is in the common duct or in the gall-bladder after the first forty-eight hours. In other words, we pinch off the tube two hours at a time, so that the patient gets some lime salts and bile back into the system and then we give also to the patient ox-gall.

Dr. C. S. Foster, Pittsburgh, Pa.—In many cases of cholecystostomy and cholecystectomy the indications are absolute, such as the big gall-bladder or diseased gall-bladder, as referred to by Dr. Swope. Sometimes we go into the abdomen and find a normal appearing blue gall-bladder that we should take out. How do we know it should be taken out? These cases are often drained and we have a recurrence of the symptoms. In these cases also we find the strawberry gall-bladder, so to speak, or the papillomatous gall-bladder that Dr. Erdmann spoke of. There is an indication for taking these gall-bladders out that up to the present are not producing symptoms. For instance, if we inspect the ducts and the ampulla of the gall-bladder and find the glands enlarged along the ducts, independent of pancreatic disease or of involvement of the duodenum or the stomach, we know that such a gall-bladder is infected and that gall-bladder ought to be taken out. Infection travels through the portal circulation of the liver, and no matter if we drain the gall-bladders that are apparently healthy with a blue-colored serosa, we have a recurrence of the symptoms. These cases are generally known as the papillomatous gall-bladders, or the strawberry gall-bladders, and the indication is when we find enlargement of the glands along the duct, the gall-bladder should be extirpated.

Dr. John W. Keefe, Providence, Rhode Island.—When a man comes before us and reports 2600 operations on gall-bladders, we have to sit up and listen, and no doubt his experience leads him to

do the operation in a definite way. He also comes to the conclusion that in a certain proportion of cases he will remove the gall-bladder. I firmly believe that men like my friends Drs. Swope and Erdmann, who say that they are removing more gall-bladders to-day than formerly, are more expert in doing that operation than most of us; but I believe that many surgeons, from reading this paper, would come to the conclusion that now we must remove practically all gall-bladders. Those men who are taking out all gall-bladders I believe are going to do a great deal of harm, because the general profession does not understand that these men are particularly skilful in taking out these gall-bladders. I firmly believe we ought not to operate during the acute stage of inflammation in gall-bladder disease. Occasionally, we will have a perforation and have gangrene, yet there will be a few cases in which it is necessary to operate during that period; but if one could refrain from operating on the acute cases and wait until convalescence is established, he would meet with greater success when he does come to operate. It comes down to the personal equation as to whether one should remove the gall-bladder or drain. There is no question in my mind but that the general mass of surgeons, will do better by doing a cholecystostomy in most instances, rather than a cholecystectomy. There are some cases where the average man may remove the gall-bladder at the primary operation successfully. If you do not get a result from the primary operation of cholecystostomy we still have the operation of removing the gall-bladder. At one time it was thought that if we drained we might have considerable difficulty in removing the gall-bladder subsequently. Now, we know that is not so: that any good surgeon has no difficulty in removing the gall-bladder at the secondary operation.

With reference to the question of morbidity, that is one thing to be avoided by us all, but do not surgeons have morbidity following cholecystectomy? We all know that at times stones are formed in the hepatic ducts and not in the gall-bladder alone. In some of these cases where we have to remove the gall-bladder and drain the common duct, we find a permanent fistula. What are you going to do with these people that are walking about with permanent biliary fistulæ?

Dr. Francis Reder, St. Louis, Missouri.—Dr. Erdmann has brought out a very important point in regard to feeding with ox-gall the patient who is deprived of bile salts.

If you are reasonably certain that the patient's bile is in a normal condition you can feed that patient with his own bile. It is necessary, however, to introduce it into the stomach with a stomach-tube, otherwise the patient will reject it.

Dr. Swope (closing the discussion).—In regard to the removal of the gall-bladder, I have never had a fistula follow its removal, and I have taken out a great many gall-bladders. The removal of the gall-bladder is to me a very satisfactory operation, and if there is no jaundice, I take these gall-bladders out almost always, regardless of how high the inflammation is. It is very much like a diseased

appendix, when the abdomen is opened they are removed. I have not left a diseased or suppurating appendix in for five years, and my results have been good. The same thing is true of the gall-bladder. I believe that these gall-bladders when infected and diseased ought to come out, and I do not hesitate to take them out, and my patients leave the hospital in two and a half weeks and are well. When I drain these gall-bladders they are never well. I have 98 per cent. cures from cholecystectomy, and 74 per cent. only from cholecystostomy. I have heard from 1900 patients during the last fifteen years and that was the record got from them. So to-day, after so many recoveries, I would not do anything else but a cholecystectomy.

UNUSUAL CONTENTS OF INGUINAL HERNIÆ, WITH REPORT OF A CASE.

BY
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Toledo, Ohio.

It has been no small task to review the literature upon this one form of hernia, and I fear the project would have been early abandoned had not our friend and fellow-associate, Furniss, so enthusiastically come to our aid.

The difficulty has not arisen from a lack of historical material, but rather from one of judgment in selecting from voluminous works those cases that I felt might be of interest to the Fellows of this Society. Trusting that this review may not be unprofitable, I beg to submit the following:

Morton, John, 1909. *Case of a foreign body in the sac of a hernia, with remarks on the presence of foreign bodies in the abdominal cavity. Glasgow M. J.*, vol. lxxii, pp. 52–56.

Irreducible inguinal left hernia in male, aged forty-two. At the operation it was noted that the coverings were very well developed and the sac of the hernia very thick. On incising the sac a large quantity of dark serous fluid escaped. The contents were found to consist of a large piece of omentum, very extensively adherent to the fundus, and along the whole posterior wall of the sac up to and beyond the neck. While examining the adherent omentum, finger came upon a sharp body, which proved to be a fish rib, an inch and a half in length, retaining its normal curve, and being quite hard and of a yellow translucent appearance. Thinks that the acute symptoms which the patient had three weeks prior to operation, coincided with the entrance of the foreign body into the previously formed sac, causing the pain and setting up more or less acute inflammatory symptoms. Thinks that the bone must have been swallowed, and then found its way into the general peritoneal cavity by perforation of stomach or intestine.

Mumby, L. P., 1896. *Inguinal hernia involving the ovary. Brit. M. J.*, Lond., vol. i, Jan. 4, p. 17.

Child, aged four years, had ovoid swelling in right groin extending well into labium. It was due to a hernia of the intestine, together with a hernia of the ovary. Intestine was reducible, but ovary not so. Incision and dissection out of sac. Some torsion of the pedicle present, preventing its reduction until ring had been enlarged by the knife. Recovery.

Brebner, James W., 1910. *A case of enormous inguinal hernia. Transvaal M. J.*, Johannesburg, vol. vi, pp. 11–12.

Double inguinal hernia in male, Hebrew, aged forty-eight. Left inguinal hernia contained portion of cecum, with appendix, and about 3 feet of small intestine. Right inguinal hernia sac contained a large mass of omentum loaded with fat and adherent to the lining membrane. Both sides operated on. Recovery with good results.

Bonney, Charles W., 1909. *A text-book of genitourinary diseases including functional sexual disorders in man.* By L. Casper, 2d. ed., Phila., p. 286.

"Hernia of the bladder may occur in any part of the lower abdomen where other herniæ take place, but its most common location is in the inguinal canal. Even this form, however, is rare. The bladder is either adherent to other structures, with which it has escaped into the inguinal canal, or else fatty tumors pull it in; congenital abnormalities, such as increased length of the superior suspensory ligament or of the ureters, diverticula, relaxation of the bladder, etc., may also be responsible for the occurrence of this condition."

Andrews, Frank T., 1905. *Hernia of the tube without the ovary. Jour. Am. M. Ass.*, Chicago, vol. xlv, pp. 1625–1629.

Collected 362 cases of hernia of the female pelvic organs and added four observations of his own and friends.

Hernia of tube without ovary	46
Hernia of ovary and tube	80
Hernia of ovary without tube (or tube not mentioned)	167
Hernia of nongravid uterus	43
Hernia of pregnant uterus	30
Total	366

Early in the second century, Soranus of Ephesus described the first case of hernia of the ovary. No further observation was made until 1716, when Louis Leger de Gouey of Rouen wrote an article citing a case of intrahernial tubal pregnancy.

In 1901 Dr. Paul F. Morf (*Ann. Surg.*) published a very complete work on the subject.

Andrews, Frank T., 1906. *Hernia of the ovary and tube. J. Am. Med. Ass.*, Chicago, vol. xlvii, pp. 1707–1713.

Reviews the literature on hernia of the ovary and tube and analyzes cases of inguinal hernia as follows:

Right	31	Found at autopsy	7
Left	44	Not stated	1
Double	8	Operated on	80
Not stated	5		
	88		88

Results of operations:

Recoveries in	69
Deaths in	7
Not stated in	4
	80

In eighteen of the eighty cases operated on the ovaries and tubes were returned to the abdomen. In two cases the ovaries were removed and the tube returned to the abdomen. In two cases the hernia recurred and the other ovary was found in the sac.

Tubal pregnancy within the hernial sac occurred in five cases. In one case the uterus was pregnant in the pelvis, while the ovary and tube were in the hernial sac. There was strangulation in eleven cases, twisted pedicle in thirteen, cystic ovary in six, tuberculosis of the tube in two, and sarcomatous ovary in one. In eight cases intestine or omentum was mentioned in the sac and in three the vermiform appendix. The ages range from birth to fifty-two years.

Macnaughton, George W. F., 1893. *Remarkable contents of a left inguinal hernia; death from rupture of small intestine. Lancet*, Lond., vol. i, Mar. 4, pp. 470–471.

Male, aged thirty-one, in Worcester County and City Lunatic Asylum, half an hour after breakfast on Jan. 16 1893, complained of cramping pains in abdomen, and vomited. Tense left inguinal hernia. Died same day. Autopsy showed rupture of bowel. The ileum, for fully 4 feet below this level, until it passed into the hernial sac, contained blood and mucus. On reflecting the skin from the hernial swelling there was fibrous sac beneath, which on puncture exuded from 5 to 6 ounces of a muddy serous fluid. On completely laying bare the contents these were found to consist of nearly 3 free of healthy small intestine, the cecum with an elongated vermiform appendix, 5 inches of the ascending colon, and a considerable portion of the mesentery.

Bates, T., 1897. *A case of inguinal hernia with bladder in the wall of the sac. Lancet*, Lond., vol. ii, pp. 917–918.

Male, aged sixty-four, suffering from retention of urine, was admitted to Worcester General Infirmary, July 30. Catheter was passed readily and urine withdrawn; small tense right inguinal hernia noted. Attempts to reduce failed. Returned the next day with the same symptoms as before; was put to bed. Reduction later in the day was successful. Recurred same day. Alimentary canal was freely drained by castor oil. Operation was decided upon when repeated attempts at reduction of the hernia had failed. Sac was opened and found empty; ligation at its neck; cut off and

stump replaced in abdomen. Then another and thicker sac was found lying internal to, and partly behind and adherent to, the first one, and having attached to it several large tags of fat This second sac was opened and found to be the bladder. Wound was promptly sutured, tags of fat ligated and removed, and the skin incision was sutured over the unreduced wounded portion of the bladder, a drainage tube being inserted along the whole length of the incision with its ends protruding at each angle of the wound. Good recovery. Cause of the condition appears obscure. The most commonly held view is that the bladder is dragged through the ring by a hernia to which it is adherent.

Mr. Treves reported a case from which he argues that it is due to a growth of prevesical fat along the inguinal canal which drags the bladder finally through the ring.

Adler, James E., 1908. *Torsion of an appendix epiploica in a bilocular hernial sac. Lancet*, Lond., vol. ii, Aug. 8, pp. 377–378.

Woman, aged seventy-two, admitted to London Hospital, June 10, for strangulated hernia (inguinal). Had suffered with a reducible inguinal hernia for twenty years. Wore a truss. The day before admission reduction had failed. Anesthetic was given but reduction failed. Usual operative measures followed. "Lying in an edematous sac was a cord-like mass of omental tissue which ended below in an enlargement of about the size of a chestnut. The cord was tightly twisted on itself and contained ten half turns, and except for the large distal extremity, which was bound down to the sac by recent adhesions, the whole was lying free in a hydrocele of a hernial sac. The neck of the sac tightly constricted the cord-like mass of tissue and this on being followed toward its abdominal end was found to pass through into a second sac. The cord-like mass was found to be attached to the large intestine and proved to be an enlarged, elongated appendix epiploica; this was ligated and then removed. The sac was twisted up and obliterated and the operation completed in the usual way. The patient made an uninterrupted recovery."

Jacquemin, Francis, 1905. *Ětude clinique de l'appendicite herniaire inguinale et crurale. Thêse*, Paris, 99 pp.

Jacquemin has compiled a number of cases of inguinal and crural hernia containing the appendix.

His statistics showed the incidence of sex to be forty-five males and thirty-two females. He found that appendiceal hernia was much more frequent in inguinal than in crural hernia.

Bariety collected eighteen observations of appendiceal hernia; he found twelve inguinal, two on the left side, and six crural hernia.

The literature apparently does not contain any cases of appendix hernia in left side in women. In males the statistics show three

cases of left inguinal appendiceal hernia, and one left crural. The three observations of left inguinal appendix hernia are reported by Herbert, 1878, *Med. Times and Gaz.*, vol. ii, p. 48; Schwarz, 1898, *Centralbl. f. Chir.*, p. 748; Vautrin, 1898, *Rev. de gynec. et de chir. abdom.*, Par., Fev. 10.

From a clinical point of view nothing is gained by separating appendicular strangulation from hernial appendicitis, the lesions are identical, the cause only differs, the symptomatology is the same.

Discusses the symptomatology in detail and classifies the various types of appendicular herniæ. Prognosis is bad.

In conclusion he states that under the term hernial appendicitis one comprehends an inflammation of the ileocecal appendix in a hernia, that is the appendix alone, or properly so-called "appendicite herniaire preprement dite," or when associated with other organs, such as epiploon, cecum, intestine, etc., "appendicite en milieu herniaire."

Hernial appendicitis may occur at all ages, but is most common in advanced life and in old persons. In males it occurs almost exclusively at the level of the inguinal canal, in females almost exclusively at the crural ring. There has been reported left hernial appendicitis, but only in males. As in abdominal appendicitis, it may be divided into acute and chronic. In view of its special site it presents all of the appearances of a simple reducible or irreducible hernia, an intermittent hernia with painful crises, hernial phlegmon, strangulated enterocele or epiploitis; but it is the omental hernia which it simulates most closely.

The prognosis is very grave if one only practises taxis and temporises, but it is better after early intervention and this should be the rule.

Concludes his thesis with a large bibliography of the subject.

Massoulard, 1906. *Etranglement herniaire de l'appendicite et appendicite herniaire. Arch. prov. de chir.*, Par., vol. xv, pp. 220–236.

Massoulard draws attention to the distinction between a hernial strangulation of the appendix and appendicitis with hernia.

In a hernial appendicitis we have an inflammation of an appendix which has descended into a hernial sac.

In an appendix noninflamed which may become strangulated at the level of the hernial ring or the neck of the sac we deal with an estrangulation of the appendix and not with an appendicitis.

Cites a number of cases and adds little to what is reported in the thesis by Jacquemin.

Concedes that from a diagnostic point of view it is practically impossible to tell whether the symptoms are due to strangulation or appendix hernia or a hernial appendicitis.

Treatment should be radical and early. The prognosis is good the earlier the operation is performed.

Tubby, A. H., 1897. *Some unusual cases of hernia. Med. Press and Circular*, vol. cxv, No. 12, Sept. 22, pp. 285–286.

Male, aged three years, admitted to Westminster Hospital, June 14, 1897. Strangulated congenital left inguinal hernia. The sac contained the cecum, the appendix ceci, a portion of the colon (ascending 3 inches) and some small intestine. Operation. Recovery. Hernia of the cecum, appendix and ascending colon on the *left* side.

Girl, aged four months, admitted to Evelina Hospital for Sick Children, on March 27, 1895. Left interstitial inguinal hernia of both ovaries and Fallopian tubes. Operation. Died. Autopsy pointed to the probability that the round ligament of the left ovary had been deprived of its blood supply, and become gangrenous, and so instituted the cellulitis from which the child died.

Savariaud and Cassard, 1911. *Double hernie inguinale: Entéro-épiplòcele à droite cœcum et appendice à gauche. Bull. et mém. Soc. anat. de Par.*, vol. lxxxvi, pp. 502–503.

Male, aged five years, double inguinal hernia. Operative intervention Apr. 26, 1911. Right hernia contained small intestine and omentum; resection of sac and Bassini. Left hernia was much larger and sac contained cecum, appendix, and 10 to 12 cm. of ileum. All parts of the intestines were adherent one to another. Removal of appendix, separation of adhesions, reduction of sac contents. Bassini. Recovery.

States that the statistics of Hildebrandt and Gibson give twenty-four left hernias with appendix and cecum as contents, and 128 right forster collected fifty-six cases of left hernia without inversion.

Bonvoison and de Cumont, 1910. *Hernia inguinale congénitale double avec volumineuse hernie étranglée à gauche, contenant l'appendice. Bull. et mém. Soc. anat. de Par.*, vol. lxxv, pp. 156–157.

Male, age sixteen months, had congenital double inguinal hernia. Strangulation of left hernia containing appendix which contained thirteen glass beads or pearls and a small mussel shell which did not cause any lesion in the appendix *per se*. No lesion of appendix found after removal. Recovery. Mother was milliner and child evidently got hold of some of her materials.

Jayle, 1893. *Hernie inguinale gauche comprenant la presque totalité de l'intestin.* Perforation de l'estomac. Péritonite suraigue. *Bull. Soc. anat. de Par.*, vol. lxviii, pp. 42–44.

Male, aged fifty-five, had left inguinal hernia size of infant head for long time. Symptoms of subacute peritonitis set in with death in a few hours after seen. Autopsy showed abdomen considerably distended. Perforation of the anterior wall of the stomach. Almost all the intestines were found in the inguinal hernia. The contents of the hernial sac were: 1. a piece of omentum 12 cm. by 2 cm., 2. small intestine except duodenum and first 10 cm. of jejunum, 3. cecum and appendix, 4. transverse colon and upper portion of ascending colon, 5. descending colon and sigmoid, 6. atrophied large omentum. There were no adhesions between the intestinal loops or skin. The cause of the gastric perforation could not be elicited. They attribute it possibly due to an acute gastritis followed by perforation.

Mérigot de Trégny in his thesis cites four or five similar cases, says Jayle. The condition is rare. The existence of a complete sac, and absence of any adhesions allowed a ready cure.

Stoney, R. Atkinson, 1898. *Hernia of the iliac colon. Tr. Roy. Acad. M.*, Ireland, Dublin, vol. xxvi, pp. 397–414.

Discusses cases of femoral and scrotal herniæ. Quotes from the International Text-book of surgery, as follows: "The sigmoid flexure may form the whole or a part of the contents of the sac in a left inguinal and more rarely in a left femoral hernia. Much that has been said of cecal hernia applies also to sigmoid. The sac may be partially wanting. This variety is much rarer than the cecal form in children, though in adults it is nearly as common."

Quotes Treves System of Surgery, as follows: "A congenital hernia of the sigmoid flexure may be met with in the left inguinal region. It is produced precisely the same way as the congenital hernia of the cecum, the sac may be complete or incomplete, the bowel and the peritoneum with which it was connected having been simply displaced downward into the hernia sac."

Quotes others and Anderson in particular who states "variations in the line of attachment of the sigmoid mesocolon are probably not very rare. In the past year I have met with two instances in the dissecting room of St. Thomas' Hospital in which the curve of the iliac attachment, instead of crossing toward the sacral promontory, ran down nearly to the level of Poupart's ligament. . . Were a left inguinal hernia to occur in cases of this kind there would probably be a complete sac containing colon and perhaps omentum; but there is a closely allied abnormalty, hitherto seen only in the living subject during surgical operation, which permits a peculiar form of sacless hernia still undescribed in text-books. Here the intestine, bound to the iliac fossa by a layer of peritoneum covering its front and sides, runs downward and forward in the course

described as far as the inguinal region, but the peritoneum is reflected in such a way as to leave an uncovered portion of the gut in contact with the posterior wall of the inguinal canal. In this case, should the state of the abdominal wall permit a hernia to occur, the protruding portion of the colon would be partially or wholly sacless, and the division of the superficial coverings of the tumor would at once expose the muscular wall of the gut, the peritoneum appearing only as a sort of pouch attached to the concave or abdominal aspect of the coil. Such a hernia, if wholly sacless, must almost necessarily be small; but if it be supplemented by a hernia of the pelvic coils of the sigmoid colon it may assume large dimensions and present an incomplete sac. At least six examples of this peculiar form of hernia have been met with."

Studied the matter from all angles and arrives at the conclusion that in hernia of the iliac colon there is never a complete sac except in those rare cases where the bowel has a mesentery originally and is herniated in the ordinary manner like any other portion of the intestine.

W. B. De Garmo, in his book on "*Abdominal Hernia*," says that the contents of a hernial sac may be either omentum, intestine, or in fact any of the movable contents of the abdomen, and adds:

"In some rare cases even those organs that are not ordinarily considered movable, as the kidney or a part of the liver, have been found in the hernial sac."

Again, when referring to the "many unexpected things that have been found in the hernial sac," the same author says:

"As has been previously stated, all of the movable organs of the interior of the abdomen are found in it. . . . The stomach, liver, gall-bladder, spleen, pancreas, and kidney have all been reported as found in inguinal sacs, as well as concretions of various shapes and sizes."

But, although Dr. Garmo and a few other text-book writers say that the kidney sometimes, but *very* rarely, is found in a hernial sac, they all, with one exception, fail to cite any instances of such cases. The exception is Jonathan Macready, who refers to a case described by Dr. E. C. Wendt in which the kidney has prolapsed and was found in the right inguinal canal.

Macready also refers to a case cited by Dr. Deipser in 1887, in which, in a woman, sixty-three years of age, a right inguinal hernia contained the kidney.

Wendt's case was a woman eighty-six years old who had, for years, worn a truss for a supposed inguinal hernia. She died in a

hospital from various senile disorders, and autopsy revealed the following conditions:

"At the autopsy the right kidney was found connected by a firm band with the uterus, and was also situated in the inguinal canal, the portion protruding externally being that which had been mistaken for a hernia. It was evidently a con genital condition, and the kidney had no visible pelvis. The ureter was very much shortened. The kidney on the opposite side showed no special change. The renal artery in the inguinal kidney did not spring from the abdominal aorta; it probably arose from the iliac artery. There was no suprarenal capsule connected with the kidney removed from the inguinal ring, although it might be that one existed above."

That such cases are of extremely rare occurrence is evidenced by the fact that a careful search through numerous text-books dealing with the subjects of movable kidney and hernia, as well as a study of the periodical literature for over sixty years, has been necessary to secure the few cases noted in our bibliography.

Dr. J. G. Henry reported, in March, 1910, a case of a right inguinal hernia in an infant which had developed within a few days of the baby's birth in April, 1907. The hernia had been held in place by a support from the end of the first month of life, but when she was three months old an operation was performed, about which Henry writes the following:

"On opening the hernial sac, much was our surprise to find, instead of intestine, a kidney which had evidently long since ceased its function. Dr. Stimson was of the opinion that it had never functionated. It was ligated and removed and the baby made an excellent recovery and is at present an unusually strong and healthy child."

It is evident that Dr. Henry (writing in 1910) had not heard of the cases cited by Wendt and Deipser, since he says: "I do not recall having seen in medical literature a report of prolapse of a kidney through the inguinal canal."

As we can find but three recorded cases of the kidney being found as the contents of inguinal herniæ, and one of these diagnosticated only at autopsy, we take the liberty of adding in greater detail our experience with one more. Let me state at the outset, that in handling this case we were disturbed beyond the usual, owing to the fact that we did what we have not since done; that is, operated without previously examining the patient. The physician referring the case to us is one of such unusual training and intelligence that we were led to follow his diagnosis, and plan our operation,

without having seen the patient before we approached the operating table ready to make the incision.

Mrs. J. A. S., aged thirty-eight, resident of Detroit. Family history unimportant. A few points in her past history, subsequently obtained, are important. First, she had never suffered any illness necessitating her remaining in bed. Second, she never had any subjective urinary symptoms. Third, her first menses occurred at the age of 12, and was always painful. Periods too frequent with profuse flow; the hemorrhages increased during the past year.

About nine years previously she noticed a lump the size of a hickory-nut in the region of the right internal abdominal ring. It remained about same for eight years, when it came lower and appeared to double in size. At this time, it also became very painful.

Operation, August 22, 1914, under preliminary hypodermics of morphia and scopolamine, nitrous-oxid-oxygen, and field blocking anesthesia.

Made the usual skin incision and then found that the mass could not be pushed up into inguinal canal because adherent to labium majus. An elliptical portion of the labium majus was excised in order to free the mass which now gave me the impression that I was dealing with a kidney. However, it being almost beyond identification, an opening was made in the peritoneum. The right kidney space was then explored and found deserted. It then occurred to me that it was well to know something, at least, of the left kidney. Sweeping the hand across the peritoneal cavity, the left kidney was found normal in size, location, and touch. My hand in the pelvis found, what proved to be, a parovarian cyst 3½ inches in diameter, a subperitoneal fibroma the size of a walnut upon the fundus uteri, and a hydrosalpinx on the right side. The exploratory incision into peritoneum was then quickly closed, followed by nephrectomy of the useless right kidney, and the inguinal canal closed in the usual manner. Time from starting the gas, forty-two minutes.

A median incision was then made, the parovarian cyst, the uterine fibroid, and right tube removed. Time of second operation, including closure of wound, twenty minutes. Altogether one hour and two minutes were consumed. The kidney was composed of a mass of small cysts about ½ inch in diameter. The recovery of the patient, uneventful. She left the hospital at the end of two weeks in fine physical and psychical condition.

Recently advice from her states she has remained well uninterruptedly.

DISCUSSION.

Dr. Herman E. Hayd, Buffalo, New York.—I presume all of us have had the experience of finding everything in the contents of a hernia, but perhaps some of you have not had the unpleasant experience of having a patient upon whom you have operated fail to empty his bladder. I recall the case of a man, forty years of age

who had been operated on five years before and suppuration set in, the wound broke down, and the hernia returned. He came to me and I operated on him. I found the tissues very greatly adherent. I was very, very careful in my manipulations and succeeded in separating all tissues that were stuck together, and closed the wound and congratulated myself on having done a beautiful piece of work. In the evening I went to the hospital, as is my usual custom, and saw him at eight o'clock. Seemingly he was in splendid condition, his pulse was 72 or 74, and temperature normal. He said he felt fine. I asked him if he had passed urine and he replied he had not. A vessel was procured for him in which to pass water as I was anxious to see the condition of his urine as I do in all cases, and particularly where I do a supravaginal amputation, but he told me he could not pass water. I ordered a soft catheter, passed it, and succeeded in withdrawing about 2 ounces of bloody urine. I said to him, I am sorry, you have got to go upstairs and be operated on again. He declined at first, but after a little persuasion and insistence he consented. In the operating room, on examination, I found there was a nick in the bladder large enough to admit two fingers, and the peritoneal cavity contained a great deal of urine. I put a ligature around the opening, tied it and then sewed over by Lembert suture, inserted a drainage tube, and the man got well in a short time.

The point I want to bring out is the importance of having these patients urinate because when you least suspect it, you may nick the bladder.

Dr. Francis Reder, St. Louis, Missouri.—It has been my misfortune to injure the bladder twice, and it has made me exceedingly careful in my dissections. The great danger from injury to the bladder is, of course, infection. There is no positive way of actually determining in time during the dissection whether or not the bladder is being encountered. A vague sign, which however is usually pronounced enough to arouse suspicion, is the unusual and continued oozing during the dissection of tissues that in an ordinary hernia operation should not ooze so much. Such oozing should cause the surgeon to proceed cautiously, as he may be working in peri-vesical tissue.

Dr. Gordon K. Dickinson, Jersey City, New Jersey.—One unique cause has not been mentioned, but which led me nearly into a bad error. An old man, with a chronic inguino-scrotal hernia, which was not reduced for years, it being left-sided, presented symptoms of intestinal obstruction. I made an incision and found the large gut, the sigmoid, as I recall it, lying loose, the size of an infant's head. I was not quite satisfied and did not know just how to explain the acute symptoms. I separated the adhesions of the large gut, and I found another cavity inside of this mass into which the small intestine had herniated and had become gangrenous.

Dr. John F. Erdmann, New York City.—I recall a rather unique case in a child, under two years of age, with twisted strangulated tube. I operated on that case in the last two years resorting to excision of the tube at the time.

THE SURGERY OF THE APPENDIX.

BY

JOHN W. KEEFE, M. D., F. A. C. S., L. L. D.,

Providence, R. I.

THERE are too many deaths due to appendicitis, and the ill-timed advice given by physicians is often the cause. The medical profession and the laity must be taught that castor oil or any other cathartic should never be given in the early stages of an attack of pain in the belly. How often do we hear it said: "Oh it is simply a case of intestinal indigestion due to something you have eaten. Take a good dose of oil and you will be all right in the morning." There are many physicians to-day who do not realize how many patients they have laid in their graves by this, seemingly, innocent advice. The free administration of opiates in the early stages of the disease frequently mask symptoms and give the physician and patient a false sense of security, causing the loss of valuable time and frequently of life.

Mothers should be taught never to give a cathartic in an acute abdominal disturbance. Rest in bed, absolutely nothing by the mouth, hot or cold applications to the abdomen, and no opiates should be the early treatment.

I have observed that an intern who, while serving in a hospital, will invariably urge immediate operation at any time, either day or night; will yet, when he enters private practice, be swayed by the family, or perhaps by other reasons, to postpone operation, prescribe opiates and cathartics and wait for further developments.

Should the disease progress and perforation take place, the infected material which nature was trying to confine to the right iliac region by adhesions, is now, by the peristalsis of the bowel, spread about the abdominal cavity. Then the patient is said to have "a change for the worse" and is hurriedly sent to a hospital, perhaps late at night, for an operation to be performed, in many instances, by an intern handicapped by incompetent assistants and other disadvantages.

The physician called in the early stages of appendicitis has a tremendous responsibility. He should be a master of the situation; possess the courage of his convictions and not allow his better judgment to be turned aside by the arguments of the family or the

friends of the patient. He should act promptly and see that the appendix is removed within the first twenty-four hours.

Usually the symptoms and signs are sufficiently clear, and any man who has a license to practise medicine may diagnosticate appendicitis. Mechanical factors, as angulation or kinks, due to adhesions or bands, undoubtedly play an important rôle in the causation of this disease in many instances. There is always found more or less obstruction of the lumen of the appendix when this organ is diseased. Indiscretions in diet may precipitate an attack of appendicitis, and meat diet has been thought by some to increase the tendency to gangrene. Concretions may produce ulceration of the mucous membrane, thus permitting the entrance of bacteria at the site of the ulcer. The pressure produced by concretions may interfere with the blood supply, cause obstruction, perforation and gangrene of the appendix.

Rosenow has made clear to us that a focus of infection in some remote part of the body, for instance in the tonsil, may through the blood stream set up an inflammation in the appendix. He believes that "appendicitis in the absence of foreign bodies, commonly is a hematogenous infection, secondary to some distant focus; that it develops when, for some reason or other, the organisms in the focus, usually streptococci, have acquired an elective affinity for the appendix, and at the same time gain entrance into the circulation." He noted the frequent occurrence of appendicitis when throat affections are prevalent.

In examining 539 appendices microscopically, Stanton found definite obstruction of the lumen of the appendix demonstrable on the first day of the disease. He says, "The appendix was invariably found distended, distal to the point of obstruction. The microscopical changes shown on the first day consist of an intense diffuse polynuclear leukocytic infiltration, focal areas of hemorrhage, and necrosis involving all the coats of the appendix. Fibrinous or fibrino-purulent exudate was found upon the peritoneal surface. Extensive serous exudates are noted at the close of the first twenty-four hours of the attack.

The exudate of the first day is, usually, free from bacteria. By the second day we are contending, not only with the inflamed appendix, but with the associated peritoneal infection. Perforation of the appendix commonly occurs before the end of the second day. During the second day we find intense leukocytic infiltration involving all the coats, with ulceration of the mucosa. About three-fourths of the cases show fibrino-purulent exudate on the peritoneal

surface. On the third day there is evidence of beginning repair showing the presence of fibroblasts. On the fourth day the gangrenous cases show large areas of complete necrosis and an increase in the number of fibroblasts. Focal areas of hemorrhage into the exudate, from newly formed blood-vessels, are seen. Most appendices are perforated bacteriologically after the first few hours following the attack." These pictures emphasize most emphatically the desirability of removal of the appendix the first day of the disease and the positive abstinence from purgatives.

While it would seem that the symptoms of acute appendicitis are sufficiently well known, it is a fact, in many cases, we find physicians in doubt as to the diagnosis. We all will agree that pain of sudden onset about the umbilical or epigastric region and, within twelve hours, most marked in the right iliac region, is the first symptom noted. The pain may be easily borne or may be excruciating in character. The pain often ceases following perforation. Nausea and vomiting usually occur, yet both these symptoms may be absent. Sensitiveness to pressure near McBurney's point is quite constant, although it may vary considerably in degree. Muscular rigidity, giving a feeling of resistance on palpation, is seldom found wanting. Elevation of temperature is present, but usually not high, except in children. Occasionally a patient with very low resistance shows a normal or subnormal temperature. The temperature may be normal even after perforation. Upon arrival at the hospital patients frequently have a low temperature due to the effect of cold, or the shock of transportation from the home to the hospital, or due to gangrene. The third day the temperature and pulse may be lower, yet the leukocyte count is usually higher. This is a valuable sign. It is the lull before the storm. Little attention should be given to the temperature if the history and other symptoms and signs are definite. Increase in the leukocyte count, especially an increase in the polymorphonuclears, is often of great assistance in the diagnosis of appendicitis, although we have seen a normal count with the appendix perforated. We should bear in mind that the laboratory is not infallible, but that it is an important aid to us in our work.

The preoperative treatment should prohibit everything in the way of food by mouth; we should resort to lavage of the stomach if vomiting is troublesome. Locally, ice gives comfort in some cases, while hot applications are more soothing in others. Small rectal enemas should be given to keep the lower bowel free.

The anesthetist and the selection of the anesthetic are of im-

portance. Ether will be selected in the majority of cases. Gas-oxygen may be desirable in some instances; but local anesthesia, I believe, will be employed more frequently in the future. Operation, before the end of the first twenty-four hours from the beginning of the attack, should be insisted upon as the safest course to pursue. One can never tell the outcome in a given case of appendicitis.

Where shall we make our incision? When it is found desirable to examine the stomach, duodenum and gall-bladder as well as the appendix at the time of operation, the right rectus incision is to be preferred. When we are dealing with interval cases and there is no reason to suspect trouble with the stomach, duodenum, gall-bladder or left pelvic region, we select the McBurney or muscle-splitting operation as the one causing the least trauma to the tissues involved. Where we are dealing with a circumscribed abscess the incision should be made over the most prominent part of the tumor and the muscle-splitting operation again is the most suitable. When the appendix cannot be readily found, be content with opening and draining the abscess without removal of the appendix. However, I have seen a few patients who have had appendicitis a second time in the stump left after a portion of the appendix had sloughed and come away with the pus forming the abscess.

We are old fashioned enough to believe that the McBurney incision is the best for acute cases, even though we find it necessary to drain or remove a diseased right tube and ovary. The McBurney or gridiron incision allows sufficient room for the performance of any operation on the appendix, or the right tube and ovary. We can palpate the uterus and both tubes and ovaries; and, in a few instances, I have removed the left tube and ovary through this incision. We have fewer hernias and a stronger abdominal wall left after the muscle-splitting operation.

In a series of 129 cases occurring in my service at the Rhode Island Hospital it was found necessary to drain in sixty-five cases, showing the tendency of the profession to delay operating. During four months we operated fifty-five times, with one death. Fifty per cent. of the cases were drained. The morbidity in these drainage cases should be avoided. The tendency to a long drawn-out convalescence, due to fecal fistula and secondary abscesses, is unfortunate to say the least. We operate on most of the cases shortly after they reach the hospital. The Ochsner treatment, is not understood by the profession and consequently has done great harm.

The mesoappendix is ligated and the appendix clamped with two Ferguson clamps and cut between the clamps. Then the stump

is cauterized with carbolic acid and alcohol applied. A purse-string suture of Pagenstecher linen is placed in the cecum about the stump; the stump is then ligated and the purse string tied. A number of deaths from hemorrhage have followed the nonligation of the stump. I realize that there are many other methods of treating the stump, but the method just described is very safe and satisfactory.

One or two cigarette drains are all we have found necessary. They are removed at the end of twenty-four or forty-eight hours and replaced by rubber tissue drains. The wound is irrigated daily with a normal salt solution and thymol iodide or bismuth subiodide or iodoform is dusted over the wound. We believe that these powders are of distinct value in suppurating cases.

The wound is closed in layers with buried chromic catgut. The peritoneum is first united, then the separated muscular fibers of the internal oblique and transversalis are brought together and later the external oblique. The areolar tissue is united with plain gut and a subcuticular silver wire suture approximates the skin.

Rapidity in operating is essential when the patient is prostrated. The surgeon should not attempt too much. He should open the peritoneal cavity, attend as quickly as possible to the pathology found, drain and close the wound. Stab-wound drainage is, usually, not necessary; but, occasionally, it is of service.

The after-treatment consists of the Fowler position, witholding of food, lavage of the stomach if necessary, frequent rinsing of the mouth, tap water by rectum, and small doses of morphia. On the third day the bowels are moved by enemata, and we have found eserine and pituitrin in some cases of value where distention with gas was troublesome.

Appendicitis is a disease amenable to surgery. Early operation by a competent surgeon should be attended with no mortality. When we know this to be a fact and realize how easy it is to remove an appendix in the first twenty-four hours of the disease, is it not regrettable to hear of so many dying from this disease because of delay? Both the physicians and the laity are to blame. They must become enlightened. Though much has already been said and written on the subject, it is our duty to continue to raise our voices and cry out "Don't kill patients the victims of appendicitis, with cathartics." Make the diagnosis early. Advocate operation before the end of the first day and see to it that a man well qualified to do surgery performs the operation.

A PROGNOSTIC SIGN IN ACUTE SUPPURATIVE PERITONITIS.

BY
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Synopsis.—THE presence within the abdomen, of a free or encapsulated serous or seropurulent fluid, which is practically without odor, *by the side of an encapsulated foul material*, indicates a strong systemic defensive activity of distinct prognostic value.

There are cases of peritonitis which, by their violent symptoms and the conditions found at operation, show no apparent hope of recovery and which, notwithstanding, make straightway for recovery. It is of prognostic interest to know the signs which at an operation, in a given case, reveal this probability.

In June, 1906, on a distressingly hot summer day which seemed to accentuate the gravity of the case, there was brought to me by rail from long distance, an otherwise sturdy male babe six months old. The child had been taken acutely ill a few days before and had at once revealed the characteristic signs and symptoms of an acute general peritonitis of probable appendiceal origin. Temperature was 104° F., pulse feeble, 170 to the minute. At the operation there was found much free fluid within the abdomen, cloudy with pus, but odorless. About the ileocecal coil were extensive adhesions enclosing an abscess containing about 45 c.c. of creamy and extremely foul-smelling pus and the gangrenous appendix. The case seemed utterly hopeless; yet it turned immediately to recovery. With three drainage tubes within the abdomen the babe was found cooing merrily and taking its mother's milk the very next day; and from that time on progressed to full and speedy recovery.

The striking feature of this case was the different morbid fluids within the abdomen; a cloudy and odorless fluid was present, throughout the abdominal cavity, by the side of a stinking abscess. Could it be that the nonodorous fluids found about the appendiceal abscess were indicative of a successful effort of defense on the part of nature? In other words, did it denote a capable measure of defense?

Parallel conditions prevail in cases that are not operated upon but which, after a long and ofttimes perilous course, terminate in recovery in consequence of a spontaneous external or intraintestinal rupture of an abscess.

With many subsequent cases revealing a like experience, it may now be set forth that such finding has reliable prognostic value. The defensive material thus produced by nature, in single instances, may vary in its characteristics. It may be either clear or quite clouded serum. The serum may be free within the abdominal cavity, or encysted in one or more pockets. And, conversely, the original morbid material may be variously encapsulated in one or more pockets, and vary in degree or kind of odor in the several pockets in the same case.

The writer, throughout this period of his observations, has reported on several occasions at previous meetings this interesting finding, but never in a formal paper. To the knowledge of the writer there appears no report of a similar observation in current literature. This seems to warrant its formal presentation here.

DISCUSSION ON THE PAPERS OF DRS. KEEFE AND PANTZER.

Dr. Gordon K. Dickinson, Jersey City, New Jersey.—There is no such thing as appendicitis. Some years ago in every case of appendicitis I could put my hand on, whether the appendix was inflamed or not, where I was looking for something in the abdomen I took out the appendix and buttonholed the cecum, and I found invariably that where I had what we call appendicitis there was really a cecitis. I worked up quite a little data on this subject, and my housekeeper burnt up my papers, so that I was unable to complete my investigations on this subject. With appendicitis you have cecitis, and generally speaking my observation is that appendicitis begins as a cecitis and works down. If you have the vegetative type of appendix, wide lumen, it drains well, and you never have the acute surgical type. It may lead to a chronic fibroid ceco-appendicitis, which in time may lead to the surgical condition. If you have the carnivorous type, with swollen mucous portion, you have stasis of the secretions of the appendix and an operation is needed. It may take two or three attacks in the vegetative, before you have a sufficient amount of fibrosis at the entrance of the appendix into the cecum to close it up and cause trouble.

With reference to the incision, it should be large enough to enable you to explore the abdomen while you are about it, provided the local conditions will permit. The 1-inch incision has gone, and I hope never to come back. You must have inspection because we all know that appendicitis is prone to make trouble in the right kidney, the gall-bladder, in the stomach, and pancreas, and it is your duty to explore the abdomen if the conditions will permit, while you are there.

As to drainage, I once wrote a paper on the omentum, which I regarded as the best article I ever wrote. The omentum is a wonderful structure. We as surgeons say we drain and we do not; the omentum does the drainage for us. If you have an infected wound the omentum will take care of it. Sometimes we put in a pack to wall off the condition which surgery cannot remove, but ordinarily the omentum will do the work much better.

With reference to the remarks made by Dr. Pantzer, he will find that Nature or some unknown source will draw staphylococci into the abdomen. I have reference now to the staphylococcus albus. All the other germs are due to a temporary condition. According to researches, the staphylococcus albus plus the active leukocyte in the serum will bring about a protective immunity of the peritoneum.

Dr. Frank D. Gray, Jersey City, New Jersey.—My friend Dr. Dickinson says there is no such thing as appendicitis. I think he is wrong. Those of us who operate repeatedly on conditions we call appendicitis and have found nothing visible or appreciable but appendicitis, and no indication of cecitis whatever, and have removed the appendix and have had our patients recover, which they would not have done if they had simply cecitis, rather question the validity of the statement that there is no such thing as appendicitis. Granted that many cases are a combination of appendicitis with adventitious membranes, films, and so forth, with occasional cecitis, then the statement has some approach to the truth.

The cause of appendicitis, I believe, in the vast majority of cases is some mechanical deformity. My experience has led me to believe that almost all pathologic appendices are kinked or twisted or strictured in some way. The most usual thing is a short meso at some point which kinks the appendix, or there is an overlapping adventitious film which does the same thing. You have a blockade, a lack of free drainage, and a susceptibility to infection.

As to drainage, we undoubtedly used to drain more than we should have done. We perhaps now err on the other side and drain less frequently than we should, but this is a question of individual judgment in every case.

As to what to drain with, I would simply say do not drain with gauze. Gauze is a dam, and it will keep back secretions, pus, or whatever you want to get rid of. The ideal drain, if you want to drain, is the one of Peple, of Richmond, Virginia, which has brought to our attention three or four years ago, and known as the Peple drain. It is made up of a split rubber tube containing folded rubber dam. It drains along the whole course through the split tube. It has capillarity, supported by the rubber dam inside. It is easily removable. As to the time of removal, two or three days is the usual limit, for at that time, if you use a drainage tube, or whatever you use for drainage purposes, the surroundings are well walled off, and on taking out the drain a natural drainage tube—the sinus—is left.

With reference to the paper of Dr. Pantzer, I was impressed many years ago with perhaps the converse of what he stated and which

might be put in this way, that in cases where we do not have adhesions, but we do have a great deal of serous fluid in the peritoneal cavity, we may give a bad prognosis. In other words, when Nature is active, with the opsonins at work, you get adhesions and a walling off. When you have simply a free flow of fluid into the peritoneal cavity look out for storms.

Dr. Rufus B. Hall, Cincinnati, Ohio.—I do not want to discuss these papers, but I do want to discuss the discussion a little. I do not want it to go out from this Association that we are afraid of drainage in cases of appendicitis. While the omentum is a good doctor and will take care of a lot of filth and dirt, yet the question of drainage in acute appendicitis is a very important one to the patient as well as the doctor and his reputation. It is not always easy to say from the conditions present which patient should be drained, but it is a good working rule, as I take it, and I have done many of these operations, to drain all acute cases. In an operation that is done in the interval, ordinarily you do not have to drain at all, but all *acute* cases should be drained. Perhaps a great many of them will get well without drainage, but a great many of them will die if you do not drain. I have a case in mind that emphasizes this very much.

Just a few years ago the only child, about sixteen years of age, of a doctor in one of the cities in Ohio had acute appendicitis. They sent to one of the large cities for a specialist in surgery. This surgeon saw the patient within twenty-four hours from the time the pain in the abdomen was felt. He said here is a case of acute appendicitis and it was fortunate that he was to be able to operate on this boy now just at a time when his life could be saved. He said that this is a case that ought not to be drained. It would take care of itself, said the surgeon, and the incision was closed without drainage, and the boy was dead in forty-eight hours. It is unnecessary for me to repeat histories of this kind. If that boy had received any kind of drain he would have recovered. He died for want of a drain, and many of these acute cases, if drained, will not die.

Dr. Arthur Thomas Jones, Providence, Rhode Island.—I would like to take issue with the statement that this type of appendix which we see, that is, the open one that empties itself freely is of a perfectly harmless type. A lot of very good men have so stated that it empties itself and does not give trouble. I believe that type of appendix does give trouble in many instances, and I believe when we come across that type of appendix in our abdominal operations, it should come out at that time. It seems to me, it is just as unwise to claim that an appendix of this type does not give trouble as it is to claim that Meckel's diverticulum should not give trouble. We know as a matter of fact that the diverticulum does give trouble. It does not do so in every case, and many patients die with a Meckel's diverticulum and not know they have had it. But I believe the large open appendix which we think opens freely in a great many cases does not do so. That type of case we see in patients who are suffering from so-called "indigestion." We cannot find anything

else to account for it. We operate. There is nothing the matter with the gall-bladder, the stomach or the duodenum, and all we find is one of these large appendices of the "harmless type," but we remove the appendix and the patient has no further trouble. His indigestion so-called is cured. We all see a great many of these cases, and they are relieved after the removal of that type of appendix and I firmly believe that type of appendix does give us trouble, in many instances.

Dr. William H. Humiston, Cleveland, Ohio.—Appendicitis sometimes is quite difficult to diagnose. I have removed a great many appendices that macroscopically seemed to be perfect, but in turning them over to the pathologist he has reported structural changes not only in the mucosa but in the structures outside of the mucosa, so these cases are not acute so-called, but they give rise to a great many disturbances, especially of the digestive tract. It is my good fortune to be associated in hospital work with a physician eminent in stomach work, and he refers to me cases coming under his care for digestive disturbances, in which the history leads one to expect, and examination reveals a pelvic disorder. He insists upon a correction of the pelvic disease, after which they respond quickly to his remedies for stomach and intestinal difficulties. In making an operation for the correction of the misplaced uterus we in a great majority of cases find macroscopic evidence of disease of the appendix, and even if we do not find macroscopic evidence of disease of that organ we remove it anyway, and the pathologist usually finds a pathological condition.

With reference to the acute cases, as has been stated, I think it is better to drain them. I think it is safer. You may not require drainage in all cases, but it is hard to distinguish when you should not drain, and if you want to have a low mortality, if you want to do the best for your patients, I would advise to put in a drain, if you are in doubt. I can drain with gauze, and gauze will drain. If you have a strip of sterile gauze well placed and do not leave the opening too small so that it constricts the gauze as it comes out, you will have good drainage. The capillary effect of the gauze will be continuous, if you keep the end of it between two pieces of dry, sterile gauze frequently changed. The moment gauze is wet it stops draining. Change it frequently.

Dr. Keefe (closing).—I shall make but a few statements in closing. First, not to give cathartics, and the next, to operate as promptly as possible, the sooner the better. Of course, we can operate late and the patient may live, but by operating late the patient at times is an invalid from three to six months and sometimes for years. We have seen fecal fistulæ which lasted for years, due to operating late. We may also have secondary abscesses and adhesions and intestinal obstruction. This morbidity is due entirely to late operation. I feel that very few of us have had the opportunity of operating within the first twelve hours, and how few times we have operated within twenty-four hours, and yet it has been definitely shown the fluids are practically free from bacteria during

the first twenty-four hours. If that is so, then it is advisable to operate within the first thirty-six hours.

Dr. Pantzer (closing).—The subject of appendicitis is not as yet finally adjudicated. The very illuminating work of Rosenau bears upon this question. Rosenau has shown that tonsillitis or any infection leading to bacteremia, is prone to give rise to focal disease, anywhere there is a *locus minoris resistentiæ*. This point has not been sufficiently considered with regard to appendicitis. Appendicitis is not invariably or even commonly a recent disease. Commonly the history of the case will reveal the preceding acute attacks, which, however, often go unnoticed by the side of the more obtrusive primary extraappendiceal disease and its general malaise. The appendix, on account of its anatomical form being a blind sac, is prone to become the seat of a bacteremic infection, as shown by Rosenau. Moreover, the study of appendicitis by Sonnenburg of Berlin, which was reported and accompanied by a most pertinent exhibit of pathological specimens at the International Medical Congress in Berlin in 1890, revealed that appendicitis when it comes to clinical manifestations, commonly is but the acute exacerbation of a very chronic affair. Commonly an appendicitis is created primarily by an acute bacteremic disease of origin in a different organ (such as tonsils, teeth, external wounds, etc.) and the resultant appendicitis at first is in the form of a subacute affection. It is this subacute and chronic forerunner of the later fulminant appendicitis which gives rise to the anatomical deformities which favor not only reinfection through the blood, but eventuate in themselves the final clinical crisis. We must detect and operate these cases before the acute stage has arrived. It shall be our aim to anticipate by simple and timely procedures the heroic surgery devised by Lane and his disciples. Not only the grave clinical cases of an acute appendicitis but also the need for the heroic measures adopted to relieve intestinal stasis should be anticipated. The long smouldering chronic appendicitis should be attended to surgically before it attains the dignity of an acute emergency or crisis.

In appendicitis I have found the greatest diagnostic aid in the rectal temperature. Only within the last week there was brought from a nearby town a small boy reported to have no oral temperature of more than 99 and oftenest even subnormal temperature. The thermometer by rectum showed 103½ degrees. The day following my operation the oral temperature was 98 degrees and the rectal 104 degrees. This shows that the rectal temperature alone is a safe criterion of judgment in these cases. Even in the subacute and chronic forms the oral temperature commonly is subnormal or normal, while the rectal will reveal variously ½ to 2 degrees above normal.

With regard to my own paper, I wish to thank you for the kindly hearing given it. I will only say that it seems to me that Dr. Grey and Dr. Carstens failed to consider the point made, namely that *contrasting fluids* within the abdomen indicate an active and able defensive ability of the body to cope with the infectious invader.

A RARE CONGENITAL ABNORMALITY OF THE SIGMOID.

BY

BUDD VAN SWERINGEN, M. D.,

Fort Wayne, Ind.

(With two illustrations.)

THIS paper is inspired by the following case:

Mrs. C. C., thirty-seven years of age, has suffered constipation from childhood. She is obliged to take oil to secure a bowel movement. For years she has had a cough with more or less expectoration. She is the mother of three children. Aside from these statements, nothing of importance was elicited prior to January of this year.

The present illness dates from the latter part of September, 1914, when she visited a nearby city for the purpose of having an abortion performed upon herself. She supposed herself pregnant two weeks. A catheter was introduced into the uterine cavity to destroy the ovum and remained there till the next day. She developed pain in the abdomen, diarrhea and fever. She returned to her home in the country at the end of three weeks where she was confined to her bed until after the operation.

Examination of the chest was negative except for some large moist râles. No tubercle bacilli were found in the sputum. The heart was normal. Palpation of the abdomen elicited tenderness and tumefaction in both flanks. By the vagina the mass in the left side was felt to be very hard and larger than that on the right. A diagnosis of malignancy had been made by several consultants.

Blood examination showed 19,200 leukocytes with 68 per cent. polyneuclears. Urine negative. The patient was pale, feverish, had lost considerable weight and was evidently septic when she was brought to the hospital.

The abdomen was opened by the median incision. The omentum, firmly adherent on the left side, was loosened with considerable effort and packed back out of the way. The tuboovarian abscess on the right side, including the adherent appendix, was removed. While enucleating the left tube and ovary, both intimately adherent to the sigmoid, there was uncovered a cylindrical structure about 6 inches in length; it apparently originated from the side of the sigmoid and entered the lateral aspect of the rectum. After freeing it, I believed it to be a diverticulum open at one or, perhaps, both ends. As the main channel of the bowel was thought to be still uncovered, this diverticulum was ligated at the sigmoid and rectal attachments and removed. The left ovary and tube were now enucleated and extirpated.

Preliminary to the closure of the abdomen, water was run into the rectum. Our custom is to allow 2 quarts of water to remain in the bowel. We now discovered that the sigmoid and descending

colon could not be filled and that we had, evidently, destroyed the only passageway between the rectum and colon. We, therefore, anastomosed the rectum and sigmoid, by the Noble anastomat, at the site of the former channel.

Patient had a satisfactory, though prolonged convalescence, and went home with a fecal fistula. For this she was successfully operated May 11, 1915.

FIG. 1.—Conditions found after omentum had been removed. Dotted lines show the connections between sigmoid and rectum imbedded in the inflammatory mass about the left ligament and tube.

Dr. C. C. Grandy sends the following report on the specimen submitted to him for examination: "The material handed me consists of a musculo-membranous tube, 4 inches long, varying from ¾ to 1 inch in diameter. The outer surface is smooth and one can see circular fibers evenly distributed over it. There are neither longitudinal fibers nor peritoneum visible. Cross-section shows a mucous membrane which is not more rugous nor thrown into larger folds than mucous membrane of the normal large bowel. When fixed by formaldehyde and stained by hematoxylin and eosin, sections show the outer layer of cells to be made up of unstriped circular muscular fibers beneath which is a rather loose connective-tissue layer which contains no glands and few cells. Next to this is a mucous layer made up of normal columnar epithelium and lymphoid

cells. In this layer of lymphoid cells one sees many glands of Lieberkühn which empty into the lumen of the tube. On these findings, I should say that the specimen was a piece of large bowel of unusually small caliber and devoid of longitudinal muscular fibers and peritoneum."

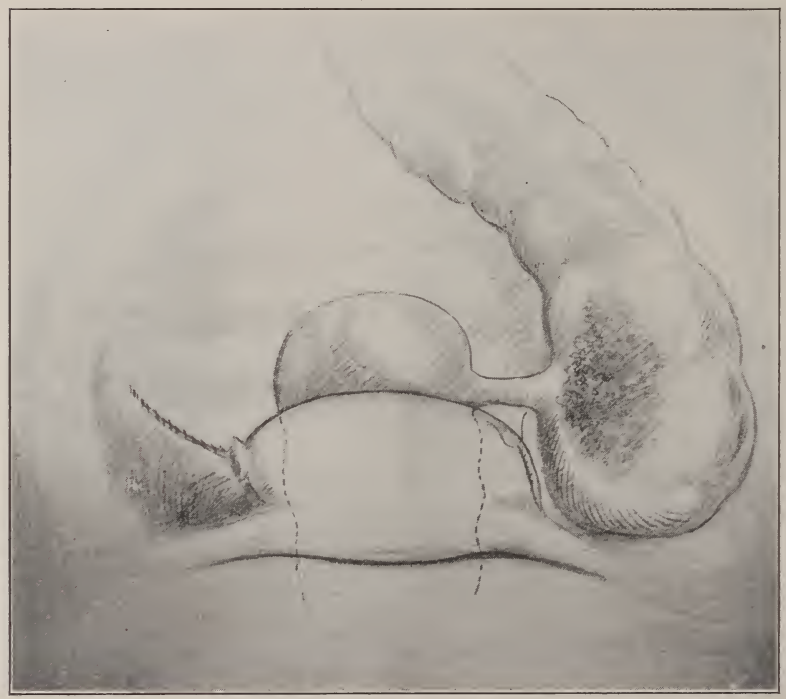

FIG. 2.—Condition after removal of both tubes and ovaries. Dark spot on sigmoid represents denuded area left by removal of ovary.

The interest in this case lies in the question as to whether or not this condition was a congenital deformity? The illustrations show very clearly the structures as found at the operation, and whether the pelvic inflammation was responsible for the reduction in caliber of this structure connecting sigmoid and rectum.

My reasons for believing it to be a congenital defect, and not a part of the sigmoid compressed by the exudate of a salpingitis and pelvic peritonitis, are as follows:

1. The history of life-long constipation and necessity for taking cathartics.

2. The tube does not come from the sigmoid at its end, nor does it enter the top of the rectum.

3. The ballooning of both the sigmoid and rectum shows a process which must have antedated the pelvic inflammation.

4. The walls of this tube do not correspond to those of a compressed tube; that is, they are not thrown into folds and by no kind of incision, on or around the tube, could its caliber be increased to that of normal bowel.

Searching the literature on the subject of congenital malformations of the large bowel, I find cases as above reported to be very rare. The Index Medicus and the Surgeon General's Index contain no reference to anything like my case. Bergman ("System of Practical Surgery") says: Any portion of the intestine may be absent or its lumen may be wanting. This is especially true of the anus or rectum. Gärtner who, in 1883, collected reports of sixty-five cases, exclusive of rectal affections, found that the most common seat of atresia is in the neighborhood of the attachment of the vitello-intestinal duct. . . . The large intestine is seldom the seat of congenital stenosis. Sometimes the sigmoid flexure is found bent at such a sharp angle as to interfere with the passage of feces. This produces secondary hypertrophy and dilatation. Johnson ("Operative Therapeutics") says: There are many instances where the sigmoid flexure becomes adherent to the Fallopian tube. On account of the proximity of the female generative organs to the sigmoid and the frequent inflammation resulting from infection of these organs, adhesions are very apt to occur between these structures.

After devoting much time and study to this case, I have arrived at the conclusion that this woman had a very rare congenital malformation of the sigmoid flexure and a very common affection of her tubes.

DISCUSSION.

Dr. James E. Davis, Detroit, Michigan.—In a recent study of 285 specimens from dissecting material at the laboratory of the University of Michigan, I found two diverticulæ of the descending colon.

Dr. Julius H. Jacobson, Toledo, Ohio.—Some years ago I had a similar case which was very interesting, and which led me to look up this subject. In my case the diverticulum was attached to the sigmoid, and ended blindly in the sacral region.

On looking up the subject I found that these diverticulæ were oftentimes remains of the neuroenteric canal, an embryological point which is often overlooked in a consideration of the etiology of diverticulitis of the sigmoid. Very early in fetal life there is a communication between the primitive gut and the spinal column known as the neuroenteric canal. The persistence of this small duct is the cause of many diverticulæ of the sigmoid and rectum.

SOME OBSERVATIONS UPON POSTOPERATIVE URETERAL FISTULÆ.

BY
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THE ureters are apt to be injured in any operation upon tissues in close proximity to the ureter, and in conditions that cause abnormal relations of the ureter to the surrounding structures. Growths that are impacted in the pelvis, that grow between the layers of the broad ligament, are apt to be associated with ureteral lesion in their removal. In these the ureter is often abnormally placed and, unless it is definitely located and identified, the likelihood of its injury is great.

In the enucleation of inflammatory pelvic masses, especially when the dissection is done from the pelvic side, the ureter is in great danger. The peritoneum may be so intimately connected with the inflammatory mass that it will adhere to it, and thus be torn away from the lateral wall of the pelvis. As the ureter goes with the peritoneum, it is in imminent danger of being severed or ligated.

I think that the greatest number of ligated and severed ureters are in hysterectomies for uterine fibroid. I have seen a number of these after operation and postmortem. Usually fistulæ do not occur unless in the operation the cervix is removed. In the supravaginal cases, should a fistula form, it is of the abdominal type, though a uretero-cervico-vaginal fistula is possible.

Since the extensive operation for carcinoma of the uterus has come into more general use, there have been more and more uretero-vaginal fistulæ. In this operation, the injury to the ureter is not due to ligating or cutting, for in it a deliberate and careful freeing of the ureter is done, but follow a necrosis of the ureteral wall, that may come from a temporary clamping of the ureter when endeavoring to stop active hemorrhage, or too much freeing and rough handling of the ureter. The blood supply of the ureter is generous, receiving, as it does, branches from the renal, the aorta, the iliacs, the ovarian, uterine, etc. These form so free an anastomosis, that the ureter may be freed, if gently done, from the kidney to the bladder and still have an adequate blood supply.

Sampson states that prolonged ligation of the ureter is less dangerous than temporary clamping, especially when the ligature material is catgut. This statement is borne out by clinical experience; for often ureters, that have been ligated for several days, will functionate properly after removal of the ligature. Recently, I had a case where the ureter was clamped for less than five minutes; when the clamp was removed the ureter was quite flat, but in the course of fifteen minutes it appeared normal. On the tenth day after operation, this patient developed an incomplete fistula on that side.

One should be particularly careful in attempts to control bleeding in the pelvis, unless he knows just where the ureter is. When bleeding occurs it can be controlled by finger pressure of the common iliac by an assistant until the bleeding point can be found and ligated.

Vaginal hysterectomies are attended with their share of ureteral injuries, especially when the operation is difficult and there is much hemorrhage that requires clamp control.

The result of injuries to the ureter naturally depends upon the manner of their infliction. If a ureter is ligated, the ureter may be permanently occluded, and the kidney cease to functionate with little, if any, disturbance to the patient. If plain catgut is used, I think it is absorbed and the ureteral flow established. I feel sure that a great many ureters have been ligated and never suspected. For this reason, it is wise to investigate the urinary tract after every difficult operation where there was a likelihood of a ureteral injury; particularly if another abdominal operation has to be performed in which a ureter may be injured. If the ureter is ligated with silk, the chances are that it will become permanently occluded, or a fistula develop when the silk cuts through the ureteral wall.

If the ureter is simply cut the urine drains from it, either into the cellular tissue or into the vagina if it has been opened. Sampson, in his experiments on dogs, drained the ureter into the abdominal cavity, and found that the ureters became occluded and that the dogs had not materially suffered. When the urine drains into the cellular tissue it may form a small pocket and the ureter become occluded, or great extravasation and extensive necrosis occur.

Most fistulæ result from necrosis of the ureter, due to too rough handling, too extensive dissection, or temporary clamping. This type, as a rule, does not make its appearance until eight to fourteen days have elapsed. It is usually of the ureterovaginal type, but if the vagina has not been opened, or has been securely closed, it may appear in the abdominal wound. The abdominal type of ureteral

fistula may occur as a result of an unsuccessful uretero-vesical anastomosis.

In all of these ureteral fistulæ, there is a marked inflammatory infiltration around the end of the ureter, and this is to be remembered in operating. In the beginning it is so great that the repair of the abdominal fistula by another anastomosis has little show of success.

Diagnosis.—In uretero-vaginal fistula, if only one-sided, and there is a functionally good kidney on the other side draining into an intact bladder, there is constant leakage from the vagina, in addition to normally voided urine. This history is not pathognomonic, for there are instances of vesico-vaginal fistula with the same symptoms.

The time of occurrence depends upon whether the ureteral injury was due to ligation, necrosis from clamping, too free dissection, or severance of the ureter. It also depends upon whether or not free escape was present for the urine that drains from the ureter. Where the vagina is open and the injury was a severance, the leakage begins immediately after the operation. In the other instances it usually does not occur until after eight to fourteen days.

From the above symptoms a presumptive diagnosis of ureteral fistula can be established. Usually it is not necessary, or advisable, to thoroughly examine the patient just at the time of the occurrence of the fistula, but better to wait until the patient is up and about and stronger.

In the examination of the patient other things, than just the diagnosis of which side the fistula is on, are to be determined; for instance, the location of the injury, whether or not it is a complete fistula, the separate and combined functional values of the kidneys, whether infection has occurred and, in malignant cases, whether the bladder and pelvis are free of growth.

The bladder is filled with a solution of indigo-carmine or methylene blue, to determine if there is any leakage into the vagina. Should there be none, it is then washed out, and the bladder filled with boric acid solution. Ten cubic centimeters of a three-tenths of a 1 per cent. solution of indigo-carmine is injected intravenously, and the elimination from the two ureters then watched. If both excrete the dye, then an attempt to determine which eliminates the greater amount is made. Next, a catheter is passed into the suspected ureter; this usually meets with obstruction in the complete fistula of long duration; in some recent cases, where the vagina is open, the catheter may pass into the vagina; in the incomplete there may or may not be obstruction. When the indigo-carmine

is eliminated from both ureters and the passage of the catheter fails to show obstruction, it is necessary to inspect the vagina, after injecting indigo-carmine or phenolsulphonaphthalein intravenously. When the last is used the cotton pledgets must be soaked in an alkaline solution to bring out the red color. The patient is put in the knee-chest posture, a Sims' speculum inserted and the vagina inspected. Usually the fistulous opening cannot be detected. The vagina is plugged with pledgets of cotton, the patient made to sit up for five minutes, as in this position the drainage is better, and the pledgets removed. By noting carefully the location of the stained ones, the position of the fistulous opening can be located.

It should be mentioned that when the bladder is examined the occurrence of a supernumerary ureter should be carefully looked for. These are rather frequent and one or both ureters of the same side may be injured.

For a determination of the function of the kidneys, inject phenolsulphonaphthalein, collect the urine from the bladder, which represents the secretion of one kidney in complete fistulæ by catheter, and that from the vagina, which represents the excretion from the other, by having the patient sit over a vessel. In this way the combined and the separate functions are determined. Another way that offers as good results, except in the presence of alkaline or pussy urine, is to inject indigo-carmine intravenously and determine the time and intensity of the elimination from each kidney.

The Natural History of Fistulæ.—In the incomplete variety, especially when only a small spot on the ureteral wall has been injured, there is not so great likelihood of the ureter becoming obstructed, and for this reason the function of the kidney is not impaired. The majority of these close spontaneously within several weeks, though there are many exceptions. After the lapse of four months and no improvement, there is little hope of the fistula closing of itself.

In the complete variety, narrowing of the tract occurs, with consequent obstruction to the urinary flow. This causes back pressure, with consequent dilatation of the ureter, the renal pelvis and the calices, and pressure atrophy of the renal parenchyma. Usually there is added infection, which hastens the destruction of the kidney function. The amount of osbtruction varies in a way with the distance from the bladder to the point of injury; when near, the tract is short, and the amount of obtsruction is not so great as when the injury is some distance from the vagina and the tract longer. In the uretero-abdominal fistulæ the tract is usually long, and

the closure soon occludes the ureter and destroys the kidney. Spontaneous closure of the uretero-vaginal fistula occurs, occasionally, but not with the frequency that it does in the abdominal type.

Treatment.—This depends upon the nature of the injury and the condition of the kidneys. In the incomplete variety a waiting policy is advocated. If this does not avail, when possible, a ureteral catheter should be passed up the ureter past the point of injury, and left in for a few days. While this is in, the patient should take urotropin, and twice a day the catheter cleansed with boric-acid injections. Should the fistula still persist, it should be treated in the same manner as a complete fistula.

The vaginal plastic operation for uretero-vaginal fistula is not to be recommended. In this the ureter itself is not implanted into the bladder, but the end of the fistulous tract. The amount of contraction and effect upon the kidney occur as if it were not treated. If one felt sure that the ureter was divided just at the bladder, and could isolate the ureter and implant it into the bladder, then the operation would be justifiable; but seldom do such fortunate conditions exist.

To determine what to do rests upon the general condition of the patient, the condition of the kidney on the side of the fistula, and that of the one that is draining into the bladder.

After an operation for carcinoma, if there is any evidence of recurrence that cannot be treated and the disease is apt to progress rapidly, or that the patient is in a bad condition from any other cause, it is better to do nothing. If the kidney on the injured side is markedly damaged, and there is infection, nephrectomy is indicated. Under such circumstances, it is usually a minor operation, as the patient is not being deprived of a useful organ. In an attempt to do a uretero-vesical anastomosis we are subjecting her to a far greater risk, and even should the operation prove a success, the drainage of the infected urine into the bladder is deleterious.

In instances where there is little if any infection, and the functional damage to the kidney is not great, an abdomino-uretero-vesical anastomosis should be performed. This can be done either transperitoneally or extraperitoneally. The first is attended with more chance of securing a firm union between the bladder and the ureter, but with a greater risk, on account of peritonitis, from infection at the time of the operation, or leakage, should the union fail. Personally, I prefer the extraperitoneal operation. This should be done with great care, for should we fail, we will have instead of a vesico-vaginal fistula, a uretero-abdominal fistula, which will probably

necessitate a nephrectomy, as the success in a second uretero-vesical anastomosis is extremely poor. In this attempt we would have to deal with marked inflammatory infiltration around the end of the ureter and along the tract, as well as with a ureter that had been shortened to such a degree that the junction between it and the bladder may be hopeless. The same applies to uretero-abdominal fistula following other operations.

In regard to the time at which these operations should be done, in the incomplete variety, I believe it is well to wait three months if there is no infection, the ureter not obstructed, and the function remains good. As soon as it shows beginning damage we should not wait further in the hope that it will close spontaneously. In the complete variety, I think, the operation should be done as soon as the patient's condition permits and the inflammatory infiltration, that always surrounds the end of the ureter and the tract has diminished.

In the abdominal type spontaneous closure of the fistula is apt to occur within a relatively short time, but if this did not take place within two months, then the operation is indicated. This usually means nephrectomy.

On account of lack of time, the question of the proper treatment of injuries to the ureter, recognized when produced, has not been considered.

In Conclusion.—The proper care of ureteral fistulæ depends upon a knowledge of the natural history, a careful study of all the conditions, and selecting the treatment that is going to give good results. I think that we have been too conservative in attempting to save kidneys that are functionally of no value, and that in this so-called conservatism we have risked too much. It is useless and unwise to attempt a uretero-vesical anastomosis in the cases where there is serious renal damage. The operation is attended with more risk than a nephrectomy and, should success follow, the drainage into the bladder from an infected kidney is of itself harmful.

REPORT OF FIVE CASES OF URETERAL FISTULA.

CASE I.—This patient was operated upon February 9, 1909, and had a vaginal hysterectomy for carcinoma of the body of the uterus. During the operation there was much bleeding and clamps were put on to control it. No urine was excreted through the bladder for three days. On the third day drainage was noticed of urine through the vagina. Two days later she was examined cystoscopically and the left ureter could be catheterized one-quarter of an inch, and the right only 1 inch. There was no evidence of

drainage of urine into the bladder, nor was there any evidence of leakage from the bladder into the vagina, as shown by the failure of indigo-carmine solution to escape from the bladder into the vagina. Four weeks after the first operation the patient had both ureters implanted into the bladder by the abdominal route, this having been done transperitoneally. At the time of operation the ureters were found about the size of the little finger and much indurated. The operation was very difficult, and took about three hours. Following the operation the patient developed pneumonia, and in coughing opened the wound upon the eighth day, the intestines escaping upon the abdomen. These were replaced, the abdominal wall resutured, and the patient made an uninterrupted recovery. This patient was under observation for a period of four months. When examined within a few weeks after the first operation the ureters were seen projecting into the bladder about one-half or three-quarters of an inch. This projection finally became smaller and when last seen projected only about one-eighth of an inch into the vagina. The urine that was discharged into the vagina was pus free and was seen coming from both ureters. In this case the point of note is the thickness of the ureters as observed a short time after the primary operation.

Case II.—Mrs. S. N., sixty-five years old. In December, 1907, she had an abdominal panhysterectomy for carcinoma of the uterus. About eight days after the operation it was noticed that urine was escaping from the vagina into the bed. I saw her shortly after this and at the time I was unable to catheterize the left ureter more than one-quarter of an inch. The right ureter was easily catheterized, and urine was obtained from it. The diagnosis of uretero-vaginal fistula was made. She then refused to have any operation. I did not see her again until August, 1908, when I did a plastic operation through the vagina. In this operation I anastomosed the ureteral fistulous opening into the bladder. From this time on there was no escape of urine into the vagina. She was very comfortable until February, 1911, when she began to complain of much bladder irritability, and noticed that there was a large amount of pus sediment in the urine. When I examined her in March I found that the fistulous opening that I had anastomosed into the bladder was about the size of a match stick, and from it was seen coming a large amount of pus. On March 25, 1911, I removed her left kidney. It was about one-third the normal size, the calices were much dilated, and there was great atrophy of the renal parenchyma. The ureter was the size of a lead pencil, dilated and thickened.

This case teaches several interesting points. *First*, she should have been operated upon very soon after the occurrence of the injury to the ureter, and the ureter should have been implanted into the bladder by an abdominal operation. *Second*, the operation that I did was not an anastomosis of the ureter into the bladder but an anastomosis of the end of the fistulous tract into the bladder, which was a mistake. *Third*, when I saw her and did the third

operation it should not have been an anastomosis of the ureteral tract into the bladder, but should have been at that time a nephrectomy, as the kidney was at that time practically functionally inactive. *Fourth*, the kidney that was removed in March, 1911, shows the effects of the obstruction that comes from contraction of the fistulous opening.

Case III.—Mrs. E. R. This patient was operated upon on Feb. 5, 1915, and had a hysterectomy for uterine fibroids. This was exceedingly difficult. Immediately following operation patient began to complain of pain in the right lumbar region. On Feb. 15, she noticed her bed was wet and from this time on there was a continual discharge of urine from the vagina. I saw her first April 1, 1915. At that time there was a continual leakage of urine through the vagina. She was given indigo-carmine intravenously and then a cystoscopy done. This dye was eliminated from the left ureter in four minutes in strong amount, but did not appear in the urine from the vagina until fifteen minutes had elapsed, and the color was faint. The patient was then put in the knee-chest position, Sims' speculum introduced, and the vaginal vault inspected. In the upper portion of the vaginal vault was a small ulcerating area that represented the unhealed portion of the vagina. Pledgets of cotton were put in and allowed to remain awhile, and then the blue portions stained by the indigo-carmine showed the point from which the urine was escaping. This was a small opening in the middle of the granulating area and situated toward the right side. Owing to the diminished kidney function, as shown by the indigo-carmine, the right kidney was removed rather than an attempt being made to anastomose the ureter into the vagina. The removed kidney showed evidence of marked pyelonephritis with dilatation of the ureter and dilatation of the calices. It is doubtful, had a ureteral anastomosis into the bladder been done in this instance, if the kidney would have resumed its function.

Case IV.—January 15, 1913, this patient had a complete hysterectomy done for fibroids. Eight days after the operation she noticed a continuous discharge of urine through the vagina. When I saw her on the 20th of March, 1913, a continuous discharge of urine through the vagina was observed. She was given indigo-carmine and the elimination was noted from the two ureters, also the vagina. Both ureters were catheterized and the ureteral-catheter on the right side met an obstruction of 2 inches from the vesical orifice. The patient was then put in the knee-chest posture, pledgets put in the vagina and after a time, when they became stained blue, it was seen that there was an injury on the right side of the vagina. When it was observed that both ureters were eliminating indigo-carmine, that there was an escape of blue-stained urine from the vagina, and no third ureter could be discovered emptying into the bladder, a diagnosis of lateral injury of the ureter was made. The determination that it was on the right side followed the discovery of obstruction to the ureter catheter on that side and the fact that the blue-stained urine came from the right side of the

vault of the vagina. On March 25, 1913, a transperitoneal ureterovesical anastomosis was made. Unfortunately, this patient died three days later from general pelvic peritonitis. The point of interest in this case, as in another that I have recently observed, is that the kidney function was well preserved after several weeks. This is particularly to be noted in those cases in which the injury to the ureter is a lateral injury and not one where the ureter has been completely divided. In those instances in which the ureter has been completely divided, the contraction of the fistulous orifice causes dilatation of the ureter and the renal pelvis with diminution of the kidney function.

Case V.—This patient had an abdominal hysterectomy for carcinoma and seven days after operation her urine was discharged from the abdominal wound. I saw here three weeks after operation and at this time the amount of discharge was slight. She was given indigo-carmine intravenously and it was found that there was prompt elimination from the right ureter, but none was seen coming from the left ureter. After fifteen minutes, a slight bluish tinge to the urine coming through the abdominal wound was seen. A week after this the discharge from the abdominal wound had ceased entirely, and there was no discharge of urine into the bladder from the left side. This case illustrates the fact that in the uretero-abdominal fistulas the contraction of the long fistulous tract becomes complete and the kidney becomes inactive from the occlusion of the ureter. The patient has been lost sight of and I do not know the subsequent history.

Case VI.—Mrs. G. This patient was seen first the 25th of May, 1915. She stated that she was forty-three years old, that she was the mother of several children, the last being born six years before. Since November, 1914, she has been troubled with an irregular, bloody, discharge from the vagina. Previous to that menstruation was irregular, but since November the discharge has been more or less constant. She has had no pain at all.

Examination shows a large cauliflower mass in the vault of the vagina, which was at the time considered inoperable. The abdomen was opened and the Percy operation was done on June 3, 1915. Following this the greater portion of the mass sloughed away, and upon inspection of the vagina the first of August there was no carcinomatous tissue to be seen through the vagina at all.

On August 5, a radical hysterectomy was done. In making the dissection from the bladder the vagina was torn into and a small carcinomatous mass was here found. It is possible that some of this was left at the time of the operation. Both ureters were freed from the bladder for a distance of 2½ inches toward the kidney. In controlling the bleeding on the left side the ureter was clamped for five minutes. On removing the clamp the ureter was quite flat, but regained its shape and appeared normal after ten minutes had elapsed.

The patient made an uneventful recovery, except on the eighth day her urine began to escape from the vagina. In addition to

this, the patient voided urine normally. When the patient was up and about indigo-carmine was injected intravenously and appeared from the right ureter in seven minutes, but none was noticed from the left. The left ureter showed no contract, and a catheter inserted into the left ureter met with an obstruction 3 inches from the vesical orifice. This discharge kept up continuously, except from Sept. 1 to Sept. 8 there was no leakage of urine. When she was examined on Sept. 10, there was a leakage from the vagina, and absolutely none from the left ureter into the bladder. Inspection of the vaginal vault showed a small granulation mass that may be just the granulation tissue of the drainage tract through the vagina.

During the patient's convalescence there was absolutely no pain in the region of the left kidney that indicated that the ureter had been tied during the operation. I believe that this fistula was due to necrosis of the ureter, caused by clamping of the ureter.

With this patient, I shall remove a portion of the granulating mass in the vault of the vagina, and have this examined to determine if it is malignant. If the patient's condition is good and there is no recurrence, then I shall undertake the repair of the fistula by the abdominal extraperitoneal route.

DISCUSSION.

Dr. Francis Reder, St. Louis, Missouri.—Dr. Furniss did not give us a very encouraging picture relative to a fistulous condition of the ureters. In the first place, he almost condemned any effort that might be made through the vagina in order to correct this condition. In the second place, he tells us that with a failure through the abdominal wall we create a condition worse than we probably had at first.

I had the misfortune only about seven weeks ago, after performing a simple hysterectomy for hemorrhagic uterus, to find, after making my final inspection of the patient preparatory to sending her home, that she had a watery discharge in her vagina. I detained her several days to determine what this moisture was. There were no vesical conditions that would lead to any suspicion that the bladder had been injured. In order to confirm this I injected some milk into the bladder, but I found no discoloration of the watery secretion that was found in the vagina. The conclusion was that the ureter had been injured. It was a most distressing time for me, for, as usually happens, this patient was somebody in the community, and her physician had assured her of a complete cure. I questioned the nurse in a roundabout manner if she had suspicioned something, and she said she did not, which was gratifying to me. I sent the patient home and requested her to report to me occasionally in regard to the peculiar discharge which I called a serous discharge from the vagina. I was very happy one morning to receive a letter from her telling me the discharge had ceased.

When Dr. Furniss read his paper I was desirous to know from him at what time he had found it advisable to attack a ureteral

fistula. This is an important question, for it is necessary that sufficient time should be given the fistula for a spontaneous closure.

Dr. K. I. Sanes, Pittsburgh, Pa.—I had a rather unique experience some ten years ago in a case of vaginal hysterectomy. A blade of one of the hysterectomy forceps broke and the parametrium was then carefully caught with another forceps. Everything looked well until seven days after operation when an uretero-vaginal fistula was discovered. During an attempt to find this fistulous opening with a ureteral catheter, the catheter entered the uterine artery and a severe hemorrhage followed. With a hemostat the bleeding was arrested and an abdominal uretero-cystotomy was then performed. The patient made an uneventful recovery. This experience shows the danger of trying to find the opening of the ureter with a ureteral catheter through the uretero-vaginal fistulous tract on account of the liability to get into the uterine artery instead of the ureter.

Dr. Furniss (closing the discussion).—One of the points I tried to bring out was the difficulty of seeing the ureteral orifices by inspection of the vagina. We never attempt to do it until we give indigo-carmin intravenously so that it will stain the urine. By plugging the vagina with cotton, and gradually taking it out, we can spot it in that way.

I had my first misfortune about a month ago when I clamped the ureter for five minutes and ten days later I got a fistula. After removing the clamp the ureter appeared normal.

MESENTERIC THROMBOSES. REPORT OF TWO CASES.

BY
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Although mesenteric thrombosis has been known to the profession since its discovery by Virchow in 1847, the clinical picture of it received little attention until the very thorough article by Litten in 1875. Virchow's investigations were made at autopsies and largely from the viewpoint of the pathologist. More recent studies have been attempted by several workers, the most important perhaps being the monograph of Jackson, Porter and Quinby. They collected all the cases up to a few years ago amounting to 214. Since that time a few cases have been reported. While the condition is perhaps commoner than was at first supposed, it is still rare enough for each case to be of some interest.

Not much attention has been given to mesenteric thrombosis by the authors of treatises on surgery and the matter is either not mentioned at all or dismissed with a few words, attributing the cause of the condition to some disease of the heart or liver or arterial system, while DaCosta says it is usually associated with endocarditis.

I believe that infection plays a decidedly more important part in the etiology than we have thought in the past. Recent studies go to show what a tremendous element infection is in all the ordinary types of embolism and thrombosis, such as occur in the saphenous and pelvic veins, the lateral sinus, the uterine sinuses, and other parts of the anatomy. It is only reasonable to infer, therefore, that the cases of acute mesenteric thrombosis are the result largely of some focus of infection, such as appendicitis, gall-bladder infections, ulcerations of the intestine or even from metastasis from a distant focus of infection.

In the cases of slow onset it is no doubt true that atheroma, or heart or liver disease, by gradually obstructing the vessels and slowing the blood current, produces a condition resulting in thrombosis.

The superior mesenteric artery is most often the seat of trouble. This artery through its branches, the inferior pancreatico-duodenal, the middle colic, the ileocolic and the terminal branches to the cecum and the appendix, supplies no less than 25 feet of intestine and affords the only blood supply to that region. The inferior

mesenteric supplies only the descending colon. As was shown by Litten's experiments, the superior mesenteric is practically an end artery and is the one commonly affected. Thrombosis of the inferior mesenteric is very rare because of the fact that it possesses anastomosing branches with the celiac, but the superior mesenteric has no such anastomoses.

Weil differentiates between ascending and descending thrombosis of the mesenteric veins. In the ascending type the main trunk of the portal vein is not involved, the process taking its origin in the radicles of one region. In the descending type the portal trunk becomes thrombosed first and symptoms of portal stasis dominate the whole clinical picture. The diagnosis is seldom made and the mortality is extremely high, about 94 per cent.

The symptoms are acute and come on suddenly. The pains are excruciating. Some cases resemble intestinal obstruction and are usually diagnosticated as such. Some resemble acute general peritonitis.

The cases can be divided into two groups, acute and chronic. The first group is by far the larger and is composed of cases sudden in onset, and colicky abdominal pain often at a time when the patient is in apparently full health. This is followed by nausea, vomiting and a diarrhea which may be bloody; or the picture may be one of obstinate intestinal obstruction of the paralytic type. Often not even flatus is passed. In many cases the temperature falls below normal. The abdomen rapidly becomes distended with gas, peristalsis is absent, and death occurs in a few hours or days. The second group consists of chronic cases insidious in onset with, sometimes, remitting symptoms; these cases have no symptoms referable to the abdomen during life; and, in a few of them, spontaneous cure has occurred.

The two cases reported herewith represent, one the acute peritonitic type, and the other the paralytic obstructive type.

Case I.—Miss A. N., aet. seventeen, weight 148, well developed, referred by Dr. Halvor Harley of Pleasantville. No children, one miscarriage. She is the victim of purulent leucorrhea, headaches and backaches. Menses began at the age of thirteen, at intervals of two weeks; flow profuse and painful; appetite and digestion good; bowels constipated. Examination reveals a fixed uterus, double pyosalpynx with infected ovaries. Abdomen is very much distended with gas, and tender over McBurney's point. There has been no bowel movement in the last three days. Temperature 103° F., pulse 120. *Diagnosis:* Ruptured appendiceal abscess. Immediate operation confirmed the diagnosis. Beside the perforated gangrenous

appendix, we found small bands of adhesions blocking the terminal ileum and 59 inches of gangrenous small intestine. The appendix and all of the gangrenous intestines were removed. Patient died of shock in three hours.

Case II.—Miss B. referred by Dr. W. E. Jonah, with a diagnosis of intestinal obstruction. Hairdresser by trade, aet. thirty-five, thin, anemic. Appendix had been removed previously. Temperature 102° F. pulse 130. Severe obstipation but not much abdominal distention. Immediate operation revealed a volvulus of the small intestine matted over by omentum and transverse colon. Under the mass a collection of 3 or 4 ounces of pus was found. The ascending and transverse colon were gangrenous, and the peritoneum much thickened. After relieving the volvulus, which was not complete, the ascending and transverse colon were resected. They were so friable that, in picking them up between the fingers, the finger tips would sink into the lumen of the bowel allowing the fecal matter and dark coagulated blood to escape. The entire abdominal cavity became soiled with the escaping intestinal contents. Patient was in a serious condition after the operation, lived nearly a week, and died of septicemia.

Neither of these cases had bloody stools and both of them presented the symptoms of the condition for which they were operated, namely: Appendiceal abscess in the first case and partial intestinal obstruction in the second. The thrombosis in each case was a complication of the existing conditions and secondary to them. In each case the thrombosis was, undoubtedly, due to a focus of infection.

The affected segment of gut may vary from a small portion of the bowel to the whole length of the intestine. One of the cases herewith reported showed an involvement of 59 inches of gangrenous gut. The largest extent of affected gut that I have been able to find recorded in literature is Dr. Elliott's case in which he removed 48 inches of bowel with the happy result of complete recovery of the patient.

The gut, under these circumstances, is of a dark chocolate color, swollen, edematous and soon becomes gangrenous. It is usually filled with old dark, more or less, clotted blood mixed with feces. In the abdomen will usually be found a bloody fluid similar to that seen in the sac of a strangulated hernia. The most hopeful cases are those in which small areas of bowel are involved and in which an early operation is done.

Any other than surgical treatment need not be considered. It is generally agreed that resection of the involved gut is best for the patient; however many cases have been lost which, possibly, might have been saved if anastomosis had been delayed and performed

later in a secondary operation. The reason for this is that one cannot be certain that the gangrene has reached its limit and may not extend farther, and that a primary, radical operation consumes more time and inflicts more trauma than the patient can stand. These patients are, usually, in bad condition when they are brought to us for operation. According to Jackson it is, therefore, better that the gangrenous portion of the gut should be brought well out of the incision leaving full liberal margins at both ends. The gut should be resected and the ends of the same sewed into the wound, which is well walled off with gauze. With both ends of the intestine thus open, distention may be relieved and signs of further extension of the gangrenous process watched. At a later date, if the patient survives, the fistula may be closed and an anastomosis done.

BIBLIOGRAPHY.

J. B. Murphy. Keen's Surgery, p. 769, vol. lv.
Eisendrath, Surgical Diagnosis, p. 272.
Choyce. System of Surgery.
Weil. *Münchener Med. Wochenschrift*, 1914, No. 20.
E. D. Friedman. *Medical Record*, Oct. 24, 1914.
H. A. Kelley. Vermiform Appendix.
Moynihan. Abdominal Operations.
DaCosta. Modern Surgery.
Jackson, Porter and Quinby. *Jour. A. M. A.*, July 2, 9, and 16, 1904.

DISCUSSION.

Dr. Charles L. Bonifield, Cincinnati, Ohio.—The condition reported by the essayist is not as rare as the literature would lead us to believe. I have found it in several cases after appendicitis operations. I believe it is one of the causes of death after appendicitis operation, and it is more frequent than we have heretofore thought. The doctor's theory of infection being a cause is absolutely correct.

Dr. Darnall (closing).—I agree with you, Mr. President, that if we look for these cases more carefully, we will find them more frequently than we have in the past.

REMOVE THE UTERUS INSTEAD OF THE OVARIES FOR INCURABLE CASES OF MENSTRUAL DISORDERS.

BY

J. H. CARSTENS, M. D., F. A. C. S.,

Detroit, Mich.

When Batty first advocated oophorectomy for incurable cases of dysmenorrhea, when Lawson Tait first recommended the removal of pus tubes, and Hegar proposed the extirpation of the uterine appendages for the various incurable disorders of the pelvic organs, the profession was very much opposed to any of these operations. The above three men, independently of each other, worked along the same lines, and published their conclusions and their work in 1873, within a few months of one another. Theirs were new propositions altogether. The large mortality of abdominal operations in those days and the views entertained concerning the sacredness of the sexual organs were so strong, that it took a good many years to convince medical men that the principle of these operations were well founded and perfectly proper. The just developing antiseptic surgery came to our aid and enabled us to show that these operative procedures were not very dangerous. Those of us who helped to make abdominal surgery, had a hard struggle. We were viciously abused in many ways. But we, notwithstanding, accomplished our object. We had to be very conservative and, therefore, only operated on the worst and most hopeless of cases. These cases, naturally, had a large mortality. This made our position all the more difficult; but with increased experience, improvement in technic, and the development of *aseptic* surgery, the mortality gradually declined. Then the general surgeons invaded the field of gynecologists, and they, together with the young inexperienced *would-be surgeons*, began to remove the ovaries indiscriminately. Then we called a halt.

As our knowledge of internal secretions improved, we found that it was necessary to discriminate carefully in the selection of our cases. Conservation of an ovary or of some of the ovarian tissue, whenever possible, was now advocated, and practised sometimes to such an extreme extent, that the operation failed to cure the patient, and a second, and, sometimes third operation was necessary to relieve the patient. I well remember calling attention to the fact,

and stating that a mere remnant of the ovary was not worth saving; that I have had a number of cases of ovarian tumors, and other conditions, develop in portions of ovarian tissue left because of the importance attached to it and which later required a secondary operation to bring about a cure. I also stated that in many cases it was not worth while to save an ovary, or part of it, that menstruation might continue and, that, indeed, in many of these cases it was our object to establish the menopause for the purpose of relieving the patient. These views, I think, are still good.

However, in due time, the profession arrived at the conclusion, that in young women healthy ovaries should be preserved; in women above forty more radical procedures were admissible. Still, in the course of time, we found that women around forty did suffer more during the menopause than younger women. I then began to do abdominal and vaginal hysterectomies for the relief in these cases, and leaving in, at least, one ovary. I soon discovered that the women so treated got along well. They never had any symptoms at all. In fact they never knew that even the uterus was removed unless they were told. This made me more courageous and I operated in this way in all these cases, leaving an ovary, or part of one, in every instance. I make it a rule to inform the patient beforehand that I am going to leave some of the ovarian tissue, and should they ever, have trouble with it a second operation will have to be done.

I remove the uterus and ovaries completely only in cases of nervous disturbances such as insanity, epilepsy, hystero-epilepsy, and in all cases where it is desirable to prevent pregnancy and when it is evident that a *cure can only be made complete by establishing the menopause*. The latter cases are rare. We have ceased to operate for the cure of epilepsy.

Obtaining such splendid and immediate results in cases requiring hysterectomy from any cause, by permitting one or both ovaries to remain, I have been induced to substitute hysterectomy for oophorectomy in cases calling for the establishment of the menopause, to bring about a cure. Permit me to cite two cases:

Miss O. K., aged twenty-three, very anemic; hemoglobin 40 per cent. She had been menstruating excessively for years, and had been curretted four or five times, when she came to consult me. At this time she had been bleeding from the uterus for three months, continuously. I suggested another thorough curetting, and experienced some difficulty in persuading her to submit to it, as the previous operations had given her no relief. However, she agreed, and I curetted her August 21, 1910. Microscopic examination of what was removed from the uterus showed adenocarcinoma. Five

days later I performed a hysterectomy without removal of the ovaries. She made an uneventful recovery. She is now the picture of health, and able to make her living.

Mrs. J. S., aet. twenty-five, sister of the first case. She had been bleeding from the womb for three months when she came to me and stated that she had been curetted three times with only temporary benefit. She had never been pregnant. I advised another curetment but she refused because the other operations had only slightly relieved her. I persuaded her, however, stating I would have to make a microscopic examination of what would be removed from the uterus. At the operation, February 10, 1915, I removed every particle of the uterine mucosa, and thoroughly swabbed the cavity with pure nitric acid, firmly believing this and was sure that would cure the patient. She gained in weight, strength and color. Microscopic examination of the scrapings showed diffuse polypoid endometritis. The third menstruation following the curetment, was rather prolonged; the fourth never ceased. She returned and insisted upon the removal of the uterus. I hesitated, and applied nitric acid every third day for a month but of no avail. Finally I decided to make a vaginal hysterectomy, but to leave the ovaries. This was done July 13. She made an excellent recovery, is now the picture of health, and very grateful for what I did for her.

These patients belonged to a family of bleeders. The mother and an aunt bled very profusely when menstruating. There have been in the two cases reported, no symptoms characteristic of the sudden menopause.

Heretofore, it has been a general rule with the profession, in cases of severe dysmenorrhea, or any other condition which incapacitates women from working during the menstrual period, to advise removal of the ovaries. My experience has taught me that it is much better in these pitiable cases to remove the uterus and leave one or both ovaries. These women recover rapidly from the operation and enjoy perfect health in a very short time.

CONCLUSIONS.

First.—All cases that require the establishment of the menopause, should be subjected to hysterectomy, leaving the ovaries.

Second.—Vaginal hysterectomy is preferable, but if there are indications of extensive adhesions or perhaps other abdominal complications, an abdominal hysterectomy, leaving one or both ovaries, is preferable.

DISCUSSION.

Dr. William Edgar Darnall, Atlantic City, New Jersey,—I would like to ask Dr. Carstens a question. Do these patients have any trouble at the menstrual periods with congestive symptoms,

and when he does a supravaginal hysterectomy does he leave enough of the uterus for the patient to menstruate from and do they menstruate regularly?

Dr. William H. Humiston, Cleveland, Ohio.—It is with a feeling of timidity that I arise to disagree with my friend, Dr. Carstens. He is much more able in the use of forcible English than most of our fellows and I feel a handicap in starting out. He has reported two cases of hemorrhage and dysmenorrhea cured by hysterectomy, leaving the ovaries intact. I can readily understand that removal of the uterus will stop menorrhagia, but it will not relieve her pain if she has diseased ovaries. On the other hand, Dr. Carstens has been proclaiming for years the success he has obtained with the use of the stem pessary for the cure of dysmenorrhea—that a stem pessary will cure all of these cases.

Dr. Carstens.—That is right.

Dr. Humiston.—I believe Dr. Carstens is right only in a certain per cent. of his cases. If he makes a hysterectomy for intractable menorrhagia with normal ovaries, he will succeed. If the ovaries are diseased the patient will continue to suffer unless oophorectomy is done. Many patients are made worse by the simple operation of curetment. For unless a discriminating diagnosis is made, curetment alone is not sufficient to afford relief. Dysmenorrhea for years—until there is constant pain in both ovarian regions—means a structural disease in the ovaries with all the stubborn reflex nervous disturbances that plague these patients constantly. An experienced surgeon will find on bimanual examination an anteflexed uterus with cirrhotic ovaries—ovaries smaller than normal, corrugated surface hard as ivory. Hysterectomy leaving the ovaries will not cure this case, nor will a stem pessary. Thorough dilatation of the uterine canal and oophorectomy is indicated.

A finer discriminating diagnosis is required in all stubborn pelvic complaints, or failure to relieve will be frequent. There will always be a demand for the well-trained gynecologist, as the general surgeon will fail in benefiting a large majority of these long-standing intractable cases of pelvic disease.

Dr. Rufus B. Hall, Cincinnati, Ohio.—I would like to ask Dr. Carstens to tell us if he has made any of these operations, leaving the cervix, doing a supravaginal hysterectomy for instance, and if so, when the menstrual period arrives, is there any undue suffering or pain and any bleeding from the cervical stump that is left? It is possible that the very cases the last speaker mentioned would be relieved. It is probable that if ovaries remain, even though they are diseased and the uterus is removed, the woman would be better off than if her ovaries and uterus were removed. We all know from past experience in doing hysterectomies that gradually we began to save an ovary occasionally, and then later on we were saving more and more, and this was a great advantage to the patient physically, mentally, bodily and in every way if we could leave a piece of an ovary.

The cases mentioned by the last speaker we are all familiar with.

We have been through it. We relieve some of the symptoms, but make these patients worse in some other respects, but we do not know what else to do. As I have said, this subject opens up a way to relieve women physically, although they cannot bear children, but if they are well physically after this method of treatment I for one will hail it with delight.

Dr. Hugo O. Pantzer, Indianapolis, Indiana.—The case which I would regard as being suited for this measure is that having an exquisitely tender endometrium, where the introduction of the sound gives rise to great pain. Painstaking care in seeking the differential cause of dysmenorrhea in each case and meeting this cause remedially, here as elsewhere, will achieve good. The procedure here advocated is not entirely new. Some Vienna author recently reported the similar procedure, removing also the greater part of the uterine mucosa. The results reported by him were satisfactory, and many cases had some flow regularly at the menstrual periods afterward. The quantity was variable, but some flow appeared at every menstrual period.

One allusion in the paper suggests another point. While the removal of the ovaries for the cure of epilepsy is now and generally speaking should be tabooed, I have had an interesting late report on such a case. The patient had only three attacks within the first year following the operation, and no more since.

However, to offset this benefit, her previously happy marriage had recently suffered disturbance. The patient's sexual apathy and revulsion is now threatening the dissolution of the marriage. The case is mentioned here as having a philosophic interest, both as to how the double oophorectomy relieved the epilepsy, and as emphasizing the far-reaching "social" effect of an unsexing operation.

Dr. Abraham J. Rongy, New York City.—In the treatment of cases of dysmenorrhea of the type referred to in Dr. Carstens' paper, I think it is better to remove the uterus than the ovaries for the uterus has no internal secretion, while the ovaries have, and if you retain the ovaries you retain this secretion. By removal of the uterus practically no internal secretion is lost. If the uterus or the ovaries are to be sacrificed I believe it is better to remove the uterus.

Dr. Carstens (closing).—I have talked to you gentlemen about the use of the stem pessary until you must be sick, but you must remember that I always have talked about dysmenorrhea caused by disease of the uterus. I have never talked about a stem pessary curing any case of dysmenorrhea that is caused by a cirrhotic condition of the ovary or anything of that kind. I did not report any of these cases with cirrhotic ovaries, although I might have done so. When you have a cirrhotic ovary, you generally have one involved before the other is implicated, and in one case you remove the uterus, and you save the other ovary.

As to the case reported by Dr. Humiston of a poor, sick, maiden lady, do I know them? Certainly. These women often suffer for fifteen or twenty years from ungratified sexual desire. They have got that fine mechanism and have never used it, and finally Nature

rebels, and they are suffering and something has got to be done to relieve them. They should have been married and have children. They become incapacitated from their work, whether they are school teachers, stenographers, or something else, and you must bring on the menopause. The only question is, how are you going to do it? Some of these women have a discharge. They have an endometritis. They have been curetted; they have received local treatment by the month; the discharge does not stop, you may remove the ovaries, and still you do not cure the endometritis. They are still suffering from that. How much better is it to take away the uterus and stop the secretion and stop menstruation? Isn't that better? You then cure them all at once.

As far as abdominal hysterectomy is concerned, personally, I leave a little of the cervix. Sometimes where I operate for fibroid tumors on account of extensive adhesions and so on, I find it is better and safer and a quicker operation to leave a good long cervix. In these cases you may have menstruation afterward if you leave an ovary, and sometimes they have a leukorrheal discharge. In such cases, where I want to bring on the menopause, I take out the cervix and shell out the mucous membrane, so that none of it is left except a bit of stump of the uterus.

Again, we have cases of pus tubes, and these tubes may have ruptured or may have become inspissated or may have ruptured into the rectum. We have the results of adhesions, a pulling back of the uterus or displacement of the uterus causing dysmenorrhea. In these cases you can do a vaginal hysterectomy, remove the tube, and leave an ovary, and it is marvelous how well such a woman will feel after that operation. It is unnecessary for me to call your attention to this class of cases and how to deal with them, but my remarks have reference more particularly to the young tyro who comes out of our medical colleges, and when a woman comes to him, a young woman in particular, who has pain in the side, he thinks she has some trouble with the ovary. He attributes all the pain to the ovary, but it is not. You can have the worst kind of inflammation, the worst kind of pus tubes, and the worst kind of disease of the uterus, and you will find one or the other ovary is healthy. When you have those cases that require the establishment of the menopause, leave in one of these good healthy ovaries or leave in one-half of it, then you do not have to give ovarian extract and things of that kind. They will be well, and they will feel well, have no symptoms, and will never know they had an operation. I believe in taking out the miserable, rotten uterus.

ON THE USE OF SODIUM CITRATE FOR DIRECT BLOOD TRANSFUSION.

BY

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Pittsburgh, Pa.

(With one illustration.)

THE anticoagulant effect of sodium citrate on the blood is well known. Together with sodium fluoride and the soluble oxalates it offers the best means of retaining the blood *in vitro* in the fluid state. The citrate, however, unlike the fluoride and the oxalate, is without any toxic action on the animal economy in the proportions used.

In order to understand the anticoagulant effect of the citrate, it is well to mention here the currently accepted theory of blood coagulation (Morawitz). In the blood there is present an enzyme called thrombogen. This *thrombogen*, in the presence of *calcium*, is activated by an organic thromboplastic substance which is called *thrombokinase*. In this way the thrombogen is changed to thrombin. This thrombin attacks the fibrinogen and liberates the fibrin in the meshes of which the corpuscular elements are caught, and the blood clot is thus produced.

What the citrate does is to precipitate the soluble calcium salts of the blood, and the coagulation is thus stopped.

The use of sodium citrate for direct blood transfusion in human beings was suggested by Hustin of France in 1914. In the Argentine Republic a number of investigators have had success with this substance. Lately, in New York, Dr. Richard Lewisohn and Dr. Richard Weil have reported success by the use of sodium citrate in blood transfusion.

At first, we were afraid that the toxic effects of sodium citrate were such that it would not be advisable to use it. We are studying the effect of citrate-blood transfusion and shall report that subsequently. But we can here state that there is nothing to preclude the use of the sodium citrate for transfusion purposes.

In order to make transfusion a simple procedure easy of performance, an apparatus was devised of which the accompanying illustration is a photo. It is a glass stopped, graduated, cylindrical container with a side tube near the top. The bottom of the vessel is

drawn to a tube about a quarter of an inch in diameter and bent at right angles. Accompanying this apparatus are two glass cannulæ, one male and one female, which fit *in* and *on*, respectively, the end of the container.

The method of performing the transfusion is as follows: Under all aseptic and antiseptic precautions, the *male* tube is inserted into

Fig. 1.

the vein of the donor and the *female* tube into the vein of the recipient. The tubes are so made that they can be securely fastened in the veins. Bull-dog clamps can occlude the veins at any moment. The apparatus is now connected with the cannula in the arm of the donor. Five cubic centimeters of a 10 per cent. citrate solution are put into the vessel; the blood is then allowed to run and gently stirring, with a glass rod is necessary to effect a good mixture of the

blood with the citrate solution. The blood is allowed to run until the required quantity has been obtained. The clamp is now adjusted so that blood flow ceases. The thumb is placed on the side tube, the apparatus removed from the female tube and adjusted on the arm of the recipient. The blood is now allowed to run in. The whole procedure should not take more than ten minutes.

The advantages of this apparatus are: 1. The whole procedure is visible. 2. No hurry is necessary. 3. The exact quantity of blood taken can be measured. 4. It does not require much experience to use it. 5. It can be used in a private office or dwelling. 6. The operation is not an unsightly procedure.

DISCUSSION.

Dr. Max Kahn, Pittsburgh, Pa. (by invitation).—Transfusion is indicated in cases of marked secondary anemia due to infection, malignancy, disease of the hematopoietic system parasites, etc.; in cases of pernicious anemia, and in certain metabolic diseases. In many instances, cases to be operated upon have such a degree of secondary anemia that operative procedure is almost impossible. In such cases several transfusions should be made until the blood content is raised, and the operation then performed. It is to be understood that before doing any transfusion, strict examination should be made of the suitability of the blood of the donor—the Wassermann reaction should be made and the blood should be examined for isotonicity.

The advantage of this apparatus is the ease with which transfusion can be accomplished. We have observed in a number of instances that the blood rise following transfusion is step ladder in character. By that I mean that after the transfusion the blood content will fall after the initial rise, but this fall does not reach the low level that it was previous to the transfusion. In order, therefore, to cause a blood content approximating normality, these transfusions should be repeated several times.

Sodium citrate as is well known has an anti-coagulant effect. It was at first thought dangerous to use this salt to prevent coagulation during transfusion, because of the toxic effect which certain authors have observed on the administration of this salt. We have observed no detrimental signs or symptoms that are caused by the little amount of this substance that is used during the transfusion. In order to transfuse 500 c.c. of blood it is necessary to use 5 c.c. of a 10 per cent. solution of sodium citrate. This makes the concentration of this substance in the transfused blood to be 0.2 per cent. It seems that the body oxidizes the citrate before it is excreted in the urine.

The ease and facility with which transfusion can be done by means of this apparatus are very striking, and are such as to recommend it to the general clinicians.

Dr. Julius H. Jacobson, Toledo, Ohio.—I have been very much interested in this subject of blood transfusion by this simple apparatus. For a long time I have practised arterio-venous anastomosis according to the method of Carrel and Crile. The method is oftentimes difficult and we meet with failures. In some cases the results are brilliant, in others they are not, owing to the difficulty in securing sufficient blood from the donors by direct transfusion. Lately we have been using the Kimpton-Brown tubes, and I think these tubes, when properly used, are most excellent. The method which the doctor describes seems to have advantages over the Kimpton-Brown tube.

I would like to ask two questions, first: whether the citrate solution can be used in connection with the Kimpton-Brown tube, and whether you use any paraffin on the end of the tube to prevent coagulation?

Dr. Charles L. Bonifield, Cincinnati, Ohio.—I will simply say in connection with this discussion that those who have been in the habit of using the Fischer solution which is a strong alkaline solution need have no fear of the small amount of citrate of sodium that is used in this method of preventing coagulation of blood.

Dr. Schildecker (closing the discussion).—In answer to Dr. Jacobson's first question, I would like to say that the use of sodium citrate obviates the necessity of using paraffin. Therefore, we do not use it. In answer to the second question, I do not know why this tube could not be used with the sodium citrate solution. From your description of it, I can see no reason why it should not. It is unnecessary to use air pressure in this apparatus for the reason that the cannulæ are all of large caliber, relatively speaking. You can always augment the flow by air pressure, but it is unnecessary.

NEWER CONCEPTIONS OF INTESTINAL STASIS.

BY

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Sir Arbuthnot Lane has focussed attention on intestinal stasis by his bold and successful operation for its relief; and his procedures are now extensively on trial. The purpose of this paper, however, is not to discuss his conceptions, but to describe the mechanism by which the phenomena which accompany intestinal stasis are produced and to show how certain chronic diseases result from this condition.

General depression, emaciation, progressive physical and mental weakness, loss of appetite, irregular respiration and pulse constitute the clinical picture which can be distinguished from the outwardly identical pictures of exhaustion, resulting from excessive emotion, exertion or infection, only by modern methods of diagnosis.

The identity of the clinical picture of intestinal stasis with the symptoms produced by chronic infections and by excessive exertion, led me to suspect that intestinal stasis might well be an etiological factor in certain diseases of which infection, excessive emotion and excessive exertion, are etiological factors—such as cardiovascular disease, exophthalmic goiter, diabetes, etc.

In an experimental research animals were given injections of indol and skatol, the typical products of intestinal stasis. Histological examination of the organs and tissues of these animals showed lesions in the brain, the adrenals and the liver, identical with the lesions in these organs produced by any stimulus of the kinetic system.

Chemical studies of the iodin content of the thyroid and of the glycogen content of the muscles and of the liver, gave further evidence of the increased activity of the kinetic organs in the presence of these products of intestinal stasis. In other words, after injections of indol and skatol, as after the application of other kinetic stimuli, increased functional activity of the organs of the kinetic system is evidenced, in the case of the brain, by the loss of Nissl substance; in the thyroid, by changes in the iodin content; in the liver, by histologic changes and by changes in the glycogen content; in the adrenals, by histologic changes and by increased functional

activity as evidenced by the Cannon test; in the muscles, by progressive weakness and changes in the glycogen content.

The retention of feces in the intestines, therefore, produces a continuous abnormal activation of the kinetic system from which there result morphologic and histologic changes in the energy-transforming organs of the body. The sequel of this continuous activation will be the same as the result of the continuous application of any other stimulus—some organ in the kinetic chain, the weakest, will be modified or broken under the strain; or else all will be weakened and the premature "senility," defined by Metchnikoff as due to the absorption of intestinal poisons, will result. The weakening may be first manifested in the brain, from the depressed activity of which there will result a slowing down of the whole mechanism for the transformation of energy; or the liver may be unable to bear the strain and, its inability to break down the acid by-products of energy transformation, may cause structural changes in the kidneys, causing Bright's disease or diabetes; or may act indirectly as one of the causes of cardiovascular disease; or the continuous stimulation may be first manifested by an increased activity of the thyroid gland, leading to an increased driving of the whole mechanism in Graves' disease.

As in every case of excessive kinetic activation, treatment must consist, first, in removing the local stimulus; and second, in repairing the damage sustained by other parts of the mechanism.

Nausea, indigestion, loss in weight, headache, loss in mental and physical power, especially when combined with local tenderness along the cecum and the ascending colon, suggest the diagnosis, which may be confirmed by *x*-ray findings. If the condition does not yield readily to other therapeutic measures, operation may be considered.

Since surgical trauma will drain still more the depleted stores of energy in the body, the operation is performed under complete anociation. An ample incision is made under complete local blocking with novocain. Nitrous oxid is the anesthetic of choice, although it may be necessary to add ether in order to secure complete relaxation during the development of the operative field, the ether then being omitted and the operation completed under nitrous oxid.

As soon as the abdominal wall is opened, a deep infiltration with quinin and urea hydrochlorid is made at a distance from the line of incision. As it requires from fifteen to twenty minutes for the quinin and urea hydrochlorid to become effective, novocain is depended upon to produce immediate anesthesia in the local field.

Before the effects of the novocain have disappeared, the quinin and urea hydrochlorid will have become effective and the whole abdominal field will then remain anesthetized and relaxed throughout the operation and, indeed, for several days thereafter.

In a resection of the intestines the most important consideration is the proper planning of the scope of the operation. The ample incision gives the optimum opportunity for exploration and obviates the necessity for dragging the viscera out of the wound. In other words, it makes it possible for the operation to be taken to the intestines. The intestines need not be pulled out beyond the point at which definite traction on the mesentery is being made.

The only shock-producing factors in operations on the intestines are traction on the mesentery and traumatization of the peritoneum. Suturing, cutting, burning and even crushing the intestines, independently of other factors, cannot produce shock, because no nociceptors have been evolved against these types of trauma. Anociation in intestinal operations is simple enough; therefore, as it means merely that the surgeon must avoid dragging manipulations, packing with gauze, and heavy retraction of the abdominal wall, and that he must minimize bleeding, a small amount of which is inevitable.

My procedure of choice is resection of the cecum and ascending colon, making a lateral anastomosis between the ileum and the transverse colon near the hepatic flexure and buttressing the closed ends of the ileum and the transverse colon against each other to prevent dilatation of the ends.

Of my series of sixteen cases, every patient is still living. The clinical end-effects are uneven. Some were wholly relieved; others only partially. It is obvious that the entire question is still in the crucible. We must still suspend judgment.

A CONTRIBUTION TO THE CONSERVATIVE SURGERY OF CHRONIC INTESTINAL STASIS.

BY

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(With illustrations.)

When the subject of chronic intestinal stasis first seriously engaged the attention of the medical profession of this country, it had been presented in a way which suggested very simple diagnostic measures and definite surgical relief. A patient who showed signs of intestinal toxemia was sent to the röntgenologist. If the radiographs showed bismuth in the ileum after eight hours or more, or in the colon after eighteen hours or more, chronic intestinal stasis was said to exist. A marked sagging of the transverse colon, in addition, greatly diminished the chance of relief by medical means. If, after a trial of exercise, an abdominal support, massage, a selected diet and paraffine oil, there was no decided improvement, a short-circuit, with or without a colectomy, was to be done. Within a short space of time much was written and a considerable amount of radical surgery performed by a limited number of enthusiasts. When, however, the more conservative surgeons observed frequent unsatisfactory results in the hands of the well-trained operators and frequent disastrous results in the hands of those less skilled, they straightway gave voice to their observations with the result that many surgeons were literally frightened from further serious consideration of the subject. A few adhered to the Lane technic; others sought to modify it. With a few exceptions, there is but little merit in the substitutes offered in lieu of the Lane ileocolostomy and colectomy, other than to further demonstrate the tolerance of the intestinal tract to abuse. After an apparent lull in the operative enthusiasm, considerable attention was given to debate on the etiology of the "bands," "folds" or "veils" which might be factors in causing intestinal stasis. The congenital, inflammatory and evolutionary theories all had warm advocates.

While the subject of intestinal stasis has received unwarranted surgical enthusiasm on the one hand, and, under the guise of scientific

skepticism, has been scoffed at on the other, nevertheless the work that has been done has established facts of great value. It has become a recognized factor in the production of many pathological conditions. It has been learned that a definite time limit for the emptying of the small or large intestine cannot accurately determine the existence or nonexistence of intestinal stasis. Apparently healthy individuals may retain bismuth in the intestine many hours longer than others who show intense toxemia. The retention time in the same individual may be influenced by many circumstances and vary widely. A marked prolapse of the transverse colon has been demonstrated many times in individuals apparently healthy.

FIG. 1.—Technic of dividing ileopelvic band. Lifting with delicate forceps and nicking with blunt-pointed scissors.

In other words, the pathology of the condition is dependent upon the amount of toxic absorption that the slowing of the fecal current permits and cannot be determined alone by the time required by the ntestine to empty itself, inasmuch as the apparently normal emptyng time varies so widely in individuals.

The definition of chronic intestinal stasis which came from London has not been improved upon, namely, that whenever the intestinal content is delayed sufficiently long (and regardless of the time, might be added) to permit the production and absorption of a greater amount of toxic material than the converting and excreting organs are able to deal with, intestinal stasis exists.

The *x*-ray is of greater value in determining fixed points and constrictions in the lumen of the gut than in giving information concerning the emptying time of the bowel. The existence of

certain well-defined intraabdominal structures termed "bands," "folds" or veils," which mechanically interfere with normal intestinal function, has been established beyond peradventure. Skepticism can only exist among those who have had no opportunity to observe them, or among those who stubbornly refuse to see them. The problem which confronts the practical surgeon to-day is not one which concerns the etiology of these structures, or an attempt to determine whether the toxemia is due to the chemical or the bacteriological intestinal content, or both, but rather how best to remedy the condition as it exists and to prevent recurrence. The operator should approach his case with an open mind and map

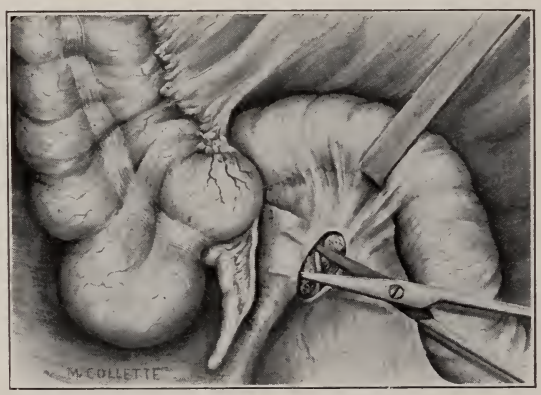

FIG. 2.—Separating cellular tissue from peritoneum, pushing veins out of harm's way before complete transverse division of band.

out his procedure only in the presence of an open abdomen. The incision should permit an inspection of the entire abdominal cavity, the type which dislocates the right rectus and incises the peritoneum and posterior rectus sheath to the right of the midline, is preferable.

Exploration should start at the esophageal end of the stomach and the entire gastrointestinal tract should be examined. Any abnormality which might interfere with normal function should be dealt with at once. It is a waste of time and causes needless tissue handling to inspect the entire abdominal contents before beginning operative repair. Do not consider that every band or fold which appears abnormal should be divided; many of these adventitious structures, acting as accessory ligaments, are of decided benefit to the individual. It is only when these bands are capable of forming mechanical obstruction to the involved organ that they should be interfered with. The operator must ever have in mind

the interpretation of conditions not as they appear on the operating-table, but rather as they would appear were the patient in the upright position. Recalling the sites where normal fixation is most apt to occur, will aid systematic search. A band is frequently

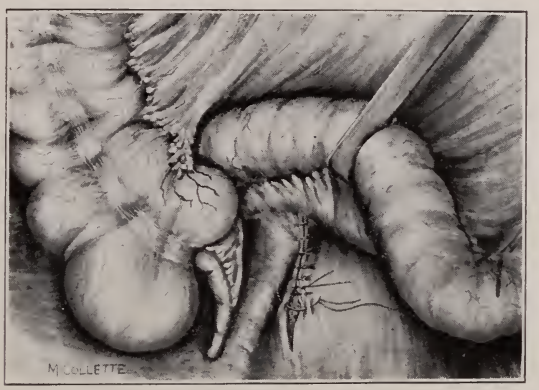

FIG. 3.—Insertion of sutures in a manner to invert edges of peritoneum. Interrupted stitches used to secure accurate approximation.

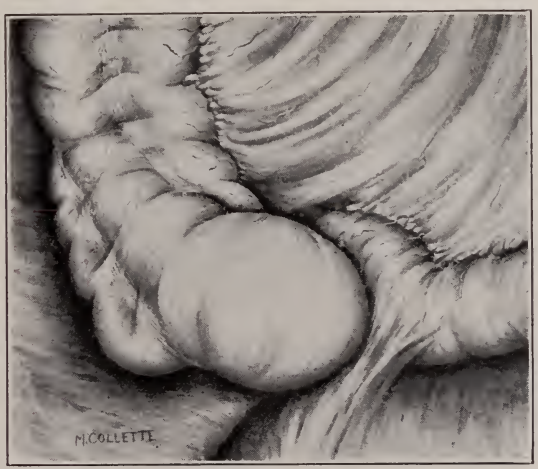

FIG. 4.—Dilated cecum with slight internal rotation and ileopelvic band. This type gives symptoms of so-called chronic appendicitis.

found extending from the transverse colon, over the transverse mesocolon, involving the pylorus or first portion of the duodenum and extending to the undersurface of the liver. Sufficient constriction or fixation of the pylorus may occur as to seriously inter-

fere with its function. The gall-bladder and bile ducts may likewise be functionally impaired by a band of this type. The second objective point should be the duodenojejunal angle. The normal curve may be replaced by an angulation so exaggerated as to interfere with the fecal current; this is almost invariably true in the presence of a dilated duodenum. After a rapid examination of the ileum, the next site meriting special attention is the ileocecal region. On the undersurface of the mesentery a few inches from the terminal ileum, converging white fibers may frequently be seen which unite to form a distinct band which extends downward and blends with the peritoneum of the pelvic floor. This band may cause a condition varying from a moderate fixation to an extreme deformity of

FIG. 5.—Dilated cecum retracted to show appendix involved in the ileopelvic band. The fixation of the cecum at its inner border favors internal rotation.

the ileum. The appendix is often firmly secured by these fibers just described, in various positions to the undersurface of the terminal mesentery or to the cecum. Fibers found on the upper mesenteric surface or others extending over the cecum may elevate and fix the appendix over the gut, thus causing a certain degree of obstruction. Again, strong bands may develop between the cecum and ascending colon and adjacent wall in such a way as to produce a deformity of the colon. The splenic and hepatic flexures of the colon may show angles exaggerated and fixed to a degree sufficient to render the passage of the fecal current difficult. A redundant pelvic colon is frequently attached to the left lateral wall by bands which form on the outer side of the mesocolon. These

may be sufficiently developed to fix this portion of the bowel in a loop or series of loops and narrow its lumen at the fixation points. An extension of this same group of bands may distort the rectum and fix it more or less firmly in a series of pouches.

Unfortunately, there appears to be a growing tendency in the profession to associate the surgery of intestinal stasis with one of two procedures—either an ileocolostomy or a colectomy. Much has been written on the radical surgery but the therapeutic possibilities of conservative plastic surgery has received but little attention.

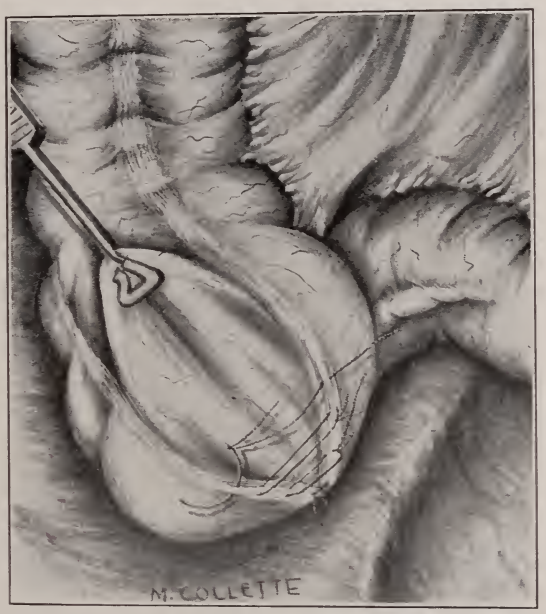

FIG. 6.—Cecal plication. Interrupted stitches passed through one-half of the longitudinal band to avoid strangulation.

The principles of repair consist in relieving fixation of the gut, and covering over all denuded areas with peritoneum. Fixation bands are divided transversely and sutured longitudinally, the peritoneal margins being inverted. The band to be divided should be picked up by delicate forceps, the peritoneum nicked with blunt-pointed scissors and the cellular tissue and any underlying blood-vessels pushed out of harm's way before the band is completely divided. Very fine round needles should be used, threaded with fine paraffined linen, the oil allowing the thread to be passed with the minimum amount of tissue trauma. It is obvious that only the principle of the repair technic

can be given for the disposition of these bands; each case is a problem in itself and frequently taxes the skill and ingenuity of the operator

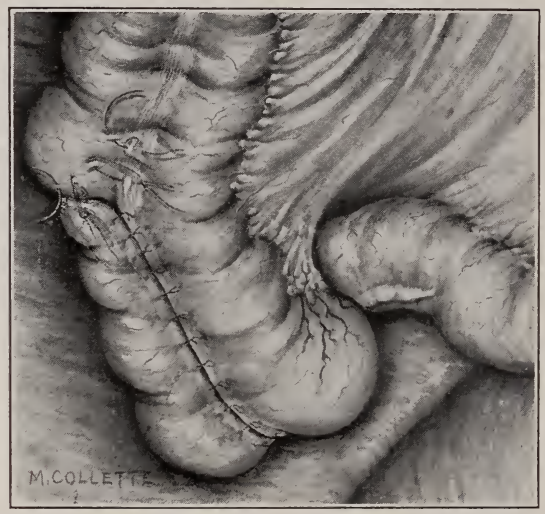

FIG. 7.—Insertion of "Y" sutures at upper limit of plication to prevent formation of a diverticulum.

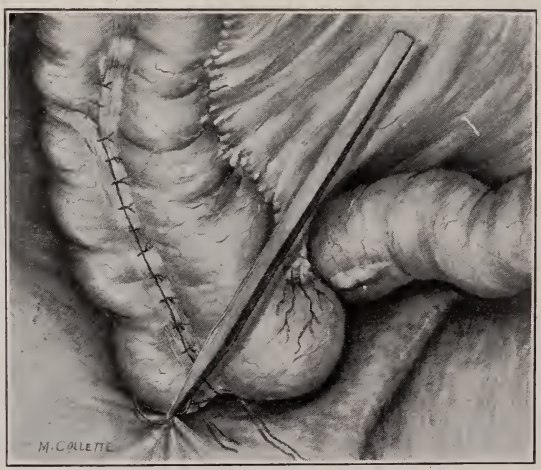

FIG. 8.—"Y" stitch complete. Securing point of union of the three longitudinal bands over appendix stump to peritoneum to prevent internal rotation and form point of countertug for the longitudinal muscle bands.

to the utmost. When the gut is secured by several bands forming a fixation area with a broad base, the repair is much more difficult.

When the denuded area cannot be covered by peritoneal plastic flaps, a portion of the greater omentum may be utilized, detached only if a drag is made on the transverse colon when the omentum is placed in position to cover the raw surface. A piece of superficial fascia with a small amount of adherent fat has been stripped from the thigh and used with success. When the operator meets an extreme condition of intestinal fixation in which conservative plastic surgery is sufficient, then more radical measures must be considered, but that is beyond the scope of this paper.

It is to certain pathological conditions found in the ileocecal region that I wish especially to call attention. The ileopelvic band is of common occurrence, easily recognized, and usually presents no great difficulty in its repair. This technic is best shown by the illustrations.

FIG. 9.—Radiograph of patient in upright position showing dropping of transverse colon and cecum over diverticulum.

Another condition frequently found is the dilated and axially rotated cecum. The toxic individual is poor in muscle tone, and the muscle fibers of the cecocolon are under more strain than those of any other portion of the intestinal tract, in having to work against gravity on an average of eighteen hours a day, until the effluent has rounded the hepatic flexure. A frequent result of this strain is the stretching of the cecal musculature, the dilated cecum thus gets its start. When the mesial border of the cecum is more or less fixed and the free outer border rests upon the inclined plane of pelvic peritoneum, the mechanical conditions are such that any increase in the size of the cecum must tend toward an internal rotation. This is aided by the intraabdominal pressure. The appendix, which is frequently involved in the bands attached to the cecal border, is often atrophic

from constriction. After carefully observing over fifty cases operated upon during the past year, the writer is convinced that the symptoms of a very large percentage of cases, diagnosed as and operated upon for the relief of a chronic appendicitis, are in no way due to an inflamed appendix, but are due rather to a cecal volvulus of varying degree. When the muscle fibers of the cecum have become attenuated, under proper conditions an acute dilatation may take place. When the mechanical conditions are favorable, as previously mentioned, the greater the distention, the greater the internal twist. This condition will produce pain, vomiting, local

FIG. 10.—Cecal diverticulum.

tenderness, muscle rigidity, rise of temperature, increased heart action and a moderate polynuclear leukocytosis. These attacks from the nature of the condition are apt to be recurrent. In the fifty cases previously alluded to, each gave such acute symptoms in varying degree; from each was removed a macroscopically normal appendix and each possessed a dilated and axially rotated cecum.

The technic employed for the relief of this condition consists in freeing the fixation bands in accordance with the principles previously mentioned, removal of the appendix, plication of the cecum and a fixation of the external longitudinal band to a flange of parietal peritoneum picked up from the right lateral wall. The details of this technic are illustrated.

It occasionally happens that in the process of development the cecum is not suspended as a pouch invested with peritoneum, but is attached to the posterior abdominal wall by two lateral layers of peritoneum which do not meet posteriorly. The cecum is thus held in a sort of pocket of peritoneum between layers of a mesocecum. When a cecum of this type begins to dilate, the greatest stretching occurs in the direction of least resistance which is downward in the loose cellular tissue under the pelvic peritoneum. There is thus created a cecal diverticulum which may harbor fecal material for a very long period. Having observed eleven such cases during the

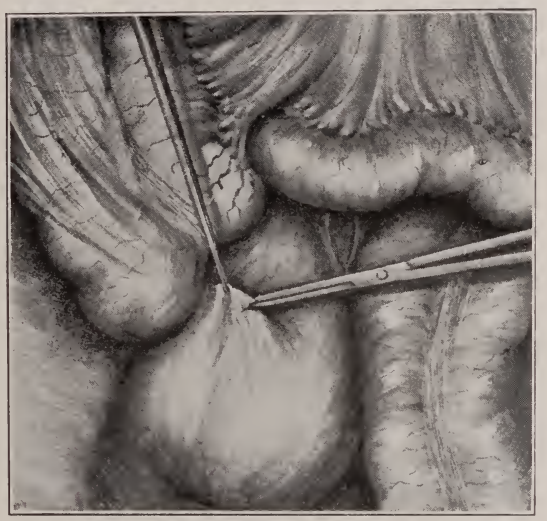

FIG. 11.—Appendix removed, ileopelvic band divided showing raw surface Picking up peritoneum from base of sac.

past year in which there was a bismuth retention of from three to fifteen days, two facts are in evidence; first, the condition cannot be extremely rare but has been overlooked; second, it merits surgical consideration. The technic employed for the repair of this type of cecal diverticulum has been used successfully in all instances, and to the best of the writer's knowledge, has not previously been described. The details of this technic are best shown in the illustrations.

Still another pathological condition occurs in many cases of intestinal stasis, especially in the presence of a dilated cecum, namely, an incompetent ileocecal valve. A number of operations have been suggested for the reconstruction of this valve, the underlying principle of each being a tucking-in of the tissues at the ileocecal junc-

tion, thus lengthening the old or creating new valve flaps. The competency or incompetency of the ileocecal valve depends far more upon the tone of the circular muscle fibers in the intestinal wall than upon the length of the membranous flaps. When an incompetent valve is rendered competent by invagination of the tissues external to the valve, it is accomplished by both a constriction of the gut and by a blocking of its lumen by the invaginated tissue. The procedure then is wrong surgically as well as mechanically and may thwart the accomplishment of the very object for which the opera-

FIG. 12.—Separating peritoneum from raw surface of gut.

tion was undertaken, the point of obstruction being merely transferred from the original site to that of the ileocecal junction. The fact that the ileocecal valve is regularly incompetent in the cadaver and in all dead animals is evidence sufficient to demonstrate that the ileocecal valve is not a perfect valve mechanically but must depend largely for its competency upon the tone of the sphincteric muscle fibers. The cure then of an incompetent ileocecal valve must depend upon a restored muscle tone, which is to be accomplished by the

relief of any mechanical obstruction to intestinal drainage and a special hygienic régime. Having seen two instances in which an incompetent valve became thoroughly competent in less than three months, valves untouched at operation, and the competency subsequently tested in the *x*-ray laboratory, I am convinced that, under proper conditions, an incompetent ileocecal valve may again function normally.

The problem of preventing the formation of postoperative adhesions appears to be ever with us. To minimize the likelihood of adhesion formation there should be the least possible amount of tissue trauma. Handle the organs as little as possible and when so doing use the utmost gentleness. Make use of an exaggerated

FIG. 13.—Insertion of invaginating stitches in muscularis of gut.

Trendelenburg position and allow the intestine to gravitate out of the pelvis rather than pack it out of the way with numerous gauze pads. An excellent method is to make use of a piece of heavy oiled silk which when boiled is very soft and slippery. This is placed against the intestine and the gauze pads spread against the silk. The most satisfactory foreign material I have left in the abdomen is sterile neutral mineral oil; before closure of the abdomen it is a routine to coat all sutured surfaces with it.

Assuming that all mechanical interference with the normal function of the intestinal tract has been relieved by operation, well may the question be asked, "If the conditions which brought about the formation of these bands be still present, what is to prevent their

reforming?" Where the surgeon considers his task finished with the closing of the abdomen, the results of intestinal stasis surgery are apt to be disappointing. It should be explicitly stated to each patient that the operation itself does not effect a cure, but it gives the opportunity for a cure to be brought about which did not previously exist. Efforts to prevent the recurrence of the abnormal conditions should start as soon as the patient leaves the operating room. The posture in bed should be such as will bring the least possible strain upon the repaired structures. In the absence of definite contraindications, the foot of the bed is elevated and the patient turned slightly on the right side. On the second day 2 drams of a good

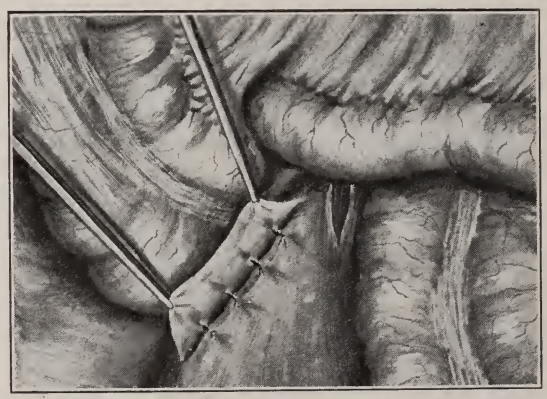

FIG. 14.—First row of peritoneal stitches. Method of overlapping redundant peritoneum.

mineral oil are given every two hours until it passes through the rectum. If no oil is passed in forty-eight hours, ten drops of castor oil is added to each dose of the mineral oil and increased ten drops a day until the bowels move. The castor oil readily mixes with the mineral oil if the latter is slightly warmed. No other cathartic need be given and violent peristalsis is avoided. The amount may then be modified to meet the requirements of the individual in keeping the fecal current soft. The diet for a number of weeks should consist of such food stuffs as leave the least amount of undigested residue. A rigid general hygienic régime is outlined, not overlooking the fact that these patients require more sleep than average individuals. When the abdominal muscles are weak and flabby, an abdominal support is advised, the patient being impressed with the idea that this is to be discarded at a later date when the abdominal muscles have become sufficiently strengthened to give a proper sup-

port. The Curtis Spring Support may be best in principle but having had such difficulty in inducing patients to wear it, I now make use in women of a good surgical corset, and in men a support constructed on the principle of the Mosher belt.

The regulation of active and passive exercise is most important. When the patient can afford it, the first week after leaving the hospital passive exercise is given every second day by a masseur especially trained in this type of work. When patients cannot

FIG. 15.—Operation completed.

afford a trained attendant, demonstrations in abdominal massage are given, to be performed by some member of the family, or, if need be, by the patient himself. The importance of continuing this is emphasized until informed that such manipulations are no longer necessary. Active exercise is regulated and insisted upon.

The study of intestinal stasis is in its infancy, it is a complex subject and must needs be considered from many viewpoints. Its surgery is comparatively new, is alluring and presents great possibilities. Attention must not be centered on any one corner of the abdomen, but the drainage scheme considered as a whole.

The conscientious surgeon must work at this problem from the conservative side, aiming to determine how little can be done to restore this patient to health, rather than allow himself to be puffed with pride over the fact that, having had his colon removed, his patient still lives.

"GAS-PAINS."

BY

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EVERY person upon whom an operation is to be performed dreads the anesthesia, the being reduced to insensibility, the taking away from him his ability to protect himself in a condition of danger. Anesthesia is abhorrent to us all, but to anyone who has had an operation, particularly an abdominal one, the recollection of "gas-pains," with its prolonged treatment and torture, is even more deterring than the anesthetic.

It is the duty of the surgeon to reduce his death rate, to save the hundredth man. It is not his only duty, however, to reduce mortality and morbidity, but to promote convalescence and render it as comfortable as possible.

The great improvement in surgical methods, the broad knowledge of the responsibilities of the profession, the intense study into post-operative conditions and their control, have greatly modified surgical procedures in the last thirty years. When abdominal conditions were first operated upon, the hemorrhage and handling of viscera, the uncertain attack and incomplete work with unnecessary drainage, led to a postoperative complication which was severe, dangerous and very distressing to the patient (and to the surgeon as well), namely: pseudo-ileus. How well we recollect when looking back into the past, sitting on the anxious seat and plugging away in Greig Smith over the chapter on tympanitis, pseudo-ileus and *peritonitis;* conditions for which we blamed the lesion, and now blame ourselves. As knowledge increased and methods became milder, pseudo-ileus ceased to be one of our fears; so that to-day rarely, if at all, does an intern meet such a condition in his hospital service.

Following pseudo-ileus came marked tympany, protracted, embarassing, engendering fear as to its outcome, and receiving active, annoying treatment from doctor and nurse.

The surgeon of the present day, in place of these conditions, is disturbed by the complaints of the patients because of "gas-pains." These pains being more subjective than objective are, sometimes, passed by with the statement: "She is so nervous." Interns are up on night calls repeatedly, their efficiency thereby being diminished

by this condition, and would-be patients often postpone operation because of the stories told by those who have suffered.

It is interesting to study the history of this abdominal reaction as noted by the different lights of the past, correlating their methods of work, the knowledge of their day, and the treatment they felt was proper and sufficient:

Tait(1) in 1873 considered it a paresis of the intestine, leading to a kink or kinking in different portions of the gut. He was inclined to the opinion that it was one link in the chain leading to peritonitis. If peristalisis could be established the condition ceased and the dangers were passed. For this he administered Epsom salts. This impressed the surgical mind for a considerable period, so much so, that in the '90's, McCosh, while operating, would inject with a needle a solution of Epsom salts into the lumen of the gut.

In 1887 Malcom(2) noted the reaction of the intestine while exposed, and made exhaustive studies as best he could. He claimed there was a reflex arterial reaction, local and general, and that the phenomenon of pseudo-ileus (which is the grandparent, as it were, of "gas-pains") was a systemic reaction as well as a local condition; and that any procedure, which drew down the gases and facilitated their discharge, would by some mysterious method control this reflex condition immediately and lead to restitution and comfort.

In 1888 Olshausen,(3) writing on this topic, considered it a disturbance of circulation in the small intestine, whereas,

Verchere,(4) the same date, blamed the absorption of poisonous substances from the intestinal tract.

Crile,(5) 1903, after a series of remarkable and extensive psychological and physiological studies of the conditions pertaining to shock, local and general, studying and experimenting on the different tissues of the body (brain, adrenals, liver, etc.), determined that trauma of the intestine affected the vasomotor system in particular; that in a short time after the viscera were taken from their natural bed and exposed to the air, aberrant vessels would appear and the intestine change in color and in consistence; that it underwent a rapid lack of tonus, which was very soon followed by arterial hypotension, associated with exhaustion of the central vasomotor mechanism; and, if this continued for a time, there was chromatolysis in the Nissl substance with similar changes in the cells of the adrenals and liver.

In 1909 Yandel Henderson(6) was led from his observations to look upon the phenomenon exhibited from another viewpoint. With him, carbonic acid and its stimulating effect upon the vasomotor tissue

was the pathogenic factor most important in intestinal activity. He claimed that anesthesia alone, that is, without operation, may be followed by the syndrome known as "gas-pains;" that ether by the open method, stimulating the respiratory center, leads to an active discharge from the blood of carbonic acid, and a condition of acapnia in the tissues. He found that when the abdomen is opened there is exhaled from the viscera, when exposed to the air or moist gauze, an excessive amount of carbonic acid; the intestine failing to retain sufficient carbonic acid to maintain tonus, paresis, dilatation and subsequent conditions follow; that the diminution in the amount of carbonic acid in the system is preceded by exaggerated breathing; and that, when loss of carbonic acid in the lungs and exhalation by the viscera are prevented, normal activity of the intestinal tract is maintained, postoperative peristalsis quickly resumed, and "gas-pains" diminished or absent. His observations indicate that carbonic acid tension in the nerve centers, and in the tissues and fluids of the body, is the factor in the maintenance of tonus in the broad sense of the word, "of the same order of importance as temperature, oxygen supply, osmotic pressure, and equilibrium of the anions and kations." It, however, does not exist in the blood as a gas, but dissolved, largely combined with alkalies and in part ionized.(21)

Mall,(7) 1896, showed that the intestine has two contracting waves: a rapid one, of about twelve per minute, for propulsion of the contents; and another, of one or two per minute, which he considered the intestinal pulse; the appendix, even, taking on the same action. The submucous venous plexus, in totality, must be of considerable consequence as to the volume of blood and the contractions, undoubtedly, are a sufficient cause for sustained circulation through the liver.

Miller(8), 1911, states that the mesenteric plexus differs from the true nerve plexus both in structure and staining reaction.

Keith(9), 1915, as a result of a long series of investigations of the gastro-enteric tract of various animals and the colons, referred to him by Arbuthnot Lane and others, claims the discovery that there are just above the cardiac orifice, in the second portion of the duodenum, at the ileocecal collar and in the large intestine, elaborations of the plexus which prove to be pace-making nodes for the activation of peristalsis. In other words, that Auerbach's plexus resembles histologically and physiologically the auriculo-ventricular bundle; that peristalsis is very similar to cardiac contractions; that one of the functions of the intestinal tract is similar to that of the cardio-vascular, that is, the circulation of the blood. Keith even goes so

far as to suggest that cardiac rhythm may be instigated in the abdomen.

Thus we see that this intra-abdominal pathology is varied according to clinical experience, acumen, and care; that the explanation of the phenomenon produced is varied according to our increase of knowledge of the different tissues, fluids, and gases of the body and their interdependence and importance; and, whereas, each observer is undoubtedly correct in part, the correlation of the factors must be studied in order to institute a rational and effective mode of treatment.

The susceptibility of the gastro-enteric tract to reflex effects has been known for centuries; as for instance, the mustard cloth to the pit of the stomach for the relief of pain, the scratching across the upper abdomen to activate a lazy upper colon, and similar irritation over the lumbar region to stimulate the rectum.

Metzler and Auer(10) found that dissection of the skin over the abdomen produced reflex inhibition of peristalsis.

Henderson's notions as to carbonic acid being the important factor in the tonus of the unstriated muscle are confirmed by several clinical observations. In the Nauheim(11) treatment of cardiac lesions carbonic acid in the bath stimulates the skin and its circulation so that it becomes pink. The arterioles and the terminal arteries dilate, thereby giving relief to the hypertension of the vascular system, reducing the blood pressure, and relieving the strained heart. If, instead of carbonic acid, oxygen be applied to the skin in a similar way, we have pallor and contracted blood-vessels. Effervescent purges are much more active, prompt, and efficient.

Decomposition of the carbohydrates in the intestinal tract leads to the formation of carbonic acid; and, according to the amount of this gas, do we have activation of the gut (18 and 23). Death by hanging, which through asphyxia leads to a surcharge of carbonic acid in the system, has a cathartic action(13). The woman in labor who holds her breath, carbonizes herself and, thereby, delivers herself more effectively than the woman who moans and cries and uses each inspiration for complaint(6).

Pieces of the intestinal tract placed in mildly effervescent carbonic solutions keep up a peristalsis which is lacking when other media are employed. So there is a physiological reason back of Henderson's discovery.

In all operations we have three factors that must be before our minds continually: the importance of the lesion, systemic conditions, and the co-equal danger of the surgeon and anesthetist. Anesthesia

as written in our books is largely a rattle of old bones, but from our journals and laboratory reports we are learning much which will tend, we hope, to bring about more sensible methods of narcosis in the immediate future.

So far as the abdomen is concerned, ether itself, so says Henderson,(6 and 21) but slightly disturbs the intestinal peristalsis in the laboratory animal, but, if the abdomen be opened and the anesthesia be administered by the open method, which means stimulation of the respiratory center, increased rapidity of breathing, a rapid discharge of carbonic acid and lowering of the carbonic acid tension in the tissues, we find that the intestines are not moving. The exhalation of carbonic acid gas in the exposed peritoneal surfaces is 0.2 c.c. per square centimeter in the first half hour, and the intestinal musculature through systemic and local loss is quickly deprived of its normal tonic agent.

Anesthesia by the closed method, and curiously enough, the profession is coming back to it unconsciously through the application of towels to the gauzes used, means less carbonic acid is being lost in respiration because of some rebreathing. So, under these conditions, visceral tonus is longer maintained. Rarely(7) do we obtain shock, local or systemic, except through abdominal operations, and even then not to a great extent if there be no loss of blood a minimum amount of manipulation and no exposure of the intestine. Moist gauze packing with wide retraction favors carbonic acid elimination. It has been well said that the responsibility of the surgeon and anesthetist is co-equal in mortality and morbidity.

A study of the physiology of the body, particularly under stress, leads one to believe nature demands that each tissue perform other functions than those ordinarily considered normal, thereby developing a greater efficiency.

As we study now the different hypotheses presented and the observations noted, it will be seen that the early investigators had only such knowledge as would lead them to note the contents of the intestinal tract, which is a septic fluid containing active germs, and their explanations were natural. Malcolm, with his mind set on the vasomotor system, very properly exploited certain phenomena the result of continued overstimulation. Crile goes further. He is the first to enunciate the broad principle that every tissue of the body allies itself when some other part becomes war-like. He investigated and found that certain cerebral cells, the adrenal cells and the liver cells, act together; and together they become exhausted in the effort to maintain body tonus. The one tissue that had not

been investigated was left to Keith; through his researches we have, seemingly, a harmonious development of the entire pathology of the syndrome under discussion.

When a surgeon opens an abdomen he sees the intestines pale, gray, flattened, no vessels, and apparently no content. If he waits a while and does not touch but simply gazes at them, he will see vessels appear on the intestines and mesentery. Slowly the intestines change to a dark red color, gases form in the interior, and they become distended. As this proceeds, the intestinal coils fill, round out at the end, kink, and produce numerous imitations of "Vella's loops."(13) Laboratory studies lead us to believe that into each intestinal loop fluid is transuded, germs become active and multiply rapidly. It is this bowel distension and the accompanying inactivity of the organ which cause the pain suffered later. A stethoscope applied to the abdomen after such an operation, fails to hear any tinkle, or evidence of intestinal life.

After an operation where we have had, as a result of exposure, carbonic acid loss and myenteric arrhythmia or block, vasomotor reflex, as well as stress affecting the brain and glandular organs, plus enteric infection, a composite picture will be produced which demonstrates that each observer found a truth but not the whole truth.

The epigrammatic Byron Robinson(14) says, "the chief duty of a physician is to cure functions. A physician comprehending pathological physiology becomes master of suggestions for the patient's benefit." Through a thorough comprehension of the many factors entering into postoperative intestinal stasis are we better enabled to apply, in all sanity, methods of treatment for the relief of pain and return of the proper peristaltic waves.

As preventive, clinicians have discovered, and the laboratory has confirmed, the immense value of a preoperative injection of morphine-atropin. According to Crile(5), morphine interferes with the oxidation of the Nissl substance and, to a considerable degree, prevents the animal's susceptibility to shock. According to Henderson(6), also Higgins and Means(23), it maintains a better carbonic acid content in the blood. Miller(8) claims that "a patient comes into the operating room more composed and tranquil, the induction period is shortened, excitement lessened, more perfect anesthesia obtained, with better relaxation and lessened secretion of mucus, and cardio-inhibitory shock prevented, although the effect is not altogether ideal."

As the reflexes in the abdomen are so ready and rapid, and the distal effect so great and permanent, operative procedure should be

as free from manipulation as conditions will allow. As hemorrhage lowers blood tension, and the effect of lowered blood tension is the production of chromatolysis, it should compel a bloodless surgery.

As the omentum is the only efficient intestinal protector(6), it is well it be kept over the intestines as far as possible. Any necessary packing should have it between the pack and the gut, the abdomen being gently raised as the packs are applied.

If the link in the chain given us by Henderson be correct, anesthesia should be ether by the closed method, although gas-oxygen may be preferable if the patient be kept pink. Postoperative treatment is as uncertain and as ineffective as that of any diseased condition, prevention being far better and more certain than efforts at cure.

Of the pharmaceuticals we have belladonna, eserine, and physostigmine. Belladonna has long ceased to be used. Eserine was exploited for a number of years, but we hear little of it now because its action is local. Metzler and Auer(10) say that physostigmine salicylate produces a marked but temporary increase of peristalsis in cases of reflex inhibition. Forchheimer(15) considers it a powerful stimulant of intestinal paralysis and claims it should be employed with extreme caution as it is apt to produce enterospasm and congestion of the gut. He expresses the same fears as to eserine. I have had no experience with hormonal, nor can I find sufficient literature that will allow me to exploit its advantages or defects. Pituitrine(22), acting on unstriated muscle, is most efficient, provided there are no great changes in the gut. We meet with failure in advanced complicated conditions. Very probably in minor conditions any one of these preparations may be followed by active peristalsis, discharge of gases, easement, and recovery.

But in the marked condition of meteorism where the stethoscope fails to get a tinkle, where the patient is miserable as well as the abdomen, where we know that Crile's chromatolysis may be proceeding, something which will meet *all* the indications presented in this paper should be employed, something which is on nature's lines and will aid her, some method of treatment, not overdisturbing to the patient, but productive of prompt relief of mind and body.

In 1900, Kemp(16) issued a little book on enteroclysis. It was published by an unimportant firm and had no general sale. His investigations have not been greatly exploited, but, for over ten years, I have been using in Christ Hospital the double current rectal irrigation as advised by him: If a normal saline solution, or plain water, enter the rectum at a temperature of 120° not as it is poured into

the bag(13) be passed into the rectum and out again for twenty or thirty minutes, a marked physiological stimulation and betterment of function will occur through the entire anatomy. The water should be flowing constantly, with occasional compression of the exit tube to better allow the large gut.

Cannon(11) tells us that fluids thrown into the rectum induce antiperistaltic waves, and are thereby carried to the cecum. Dawbarn(19), while performing a laparotomy and using the Kemp's tube, saw the water reach the cecum. The position of the large gut is such that the hot water it contains will warm up and stimulate the circulation of the large sympathetic plexuses; so not only is the intestine cleansed, but, through physiological stimulation of the sympathetic, we obtain a reflex effect upon the small gut. Through its effect upon the gastro-intestinal tract there is relief of congestion and improved circulation in the stomach and duodenum, as well as in the intestines(20), and all internal organs are disencumbered.

At the end of twenty minutes the cutaneous reflex is felt, the skin warms and normal perspiration occurs. If continued for more than twenty minutes, the circulation in the kidneys is enhanced, diuresis being instituted. It is a well-known fact(15) that a warm, mildly perspiring skin soothes mental jactitation and anxieties and promotes slumber. Various methods have been tried by me from time to time, but my interns and nurses, who judge my work impartially, invariably fall back to the Kemp's tube.

Now that we have, apparently, the entire pathology of this syndrome, physiological deviations of each of the different tissues of the intestines being diagnosticated, a true remedy can be instituted. The double-current high rectal irrigation with water at 120° F. seems to meet every indication in an advancing case of tympany. All other methods of treatment, so far as I am able to judge, seem to touch the condition but superficially. What is worth doing at all is worth doing well and thoroughly. What we do should be based on most competent knowledge and stand the test of criticism as well as experience, and in my practice the double-current high rectal irrigation has given the greatest success.

REFERENCES.

1. Tait. Diseases of the Ovaries, 4th ed., 1882, p. 314.
2. Malcolm. Physiology of Death from Traumatic Fever, 1893.
3. Malcolm. Physiology of Death from Traumatic Fever, p. 33.
4. Malcolm. Physiology of Death from Traumatic Fever, p. 34.
5. Crile. Blood Pressure in Surgery, 1903.
6. Henderson. *American Journal of Physiology*, April, 1909.

7. Mall. Johns Hopkins Reports, vol. i, 1896.
8. Miller. *Journal American Medical Association*, Nov. 23, 1912.
9. Keith. *West London Medical Journal*, July, 1915, p. 149.
10. Metzler and Auer, in Cushny. Therapeutics, 1906.
11. Faught. Blood Pressure, 1913.
12. Luciani. Human Physiology, 1911.
13. Luciani. Human Physiology, vol. ii, p. 239.
14. Robinson. Abdominal Brain, 1907.
15. Forchheimer. Therapeutics of Internal Diseases, 19131
16. Kemp. Enteroclysis, Hypodermoclysis and Infusion, 1900.
17. Mann. *Bulletin Johns Hopkins Hospital*, 1914, p. 205.
18. Cannon. Mechanical Factors in Digestion, 1911.
19. Personal Communication.
20. Musser. Practical Treatment, 1911, vol. i, p. 474.
21. Bryant and Henderson. *Journal American Medical Association*, July 3, 1915.
22. Vincent. Internal Secretions and the Ductless Glands, 1912.
23. Higgins and Means. *Journal of Pharmacology and Experimental Therapeutics*, July, 1915, p. 23.

DISCUSSION ON THE PAPERS OF DRS. CRILE, MEEKER AND DICKINSON.

DR. HUGO O. PANTZER, Indianapolis, Indiana.—I wish to express my grateful appreciation for the rich offering we have in the three papers that have been presented this morning. I feel it is an injustice to the authors of these papers that each paper shall not have special and full time for discussion. I have to find the first case in which the indications warrant doing a short-circuiting operation or a colectomy. In saying this I am duly appreciative of what one man's experience means in the presence of an intricate subject, the knowledge and study of which has not transcended the initial stages.

I am very grateful for the observations reported by Dr. Meeker. For fifteen or more years I have proceeded along similar lines, cutting freely everything suggestive of a band or membrane that might be regarded as interfering with intestinal function. Anything interfering with the even, rhythmic movement of a bowel will invariably lead to local pouching or spastic contraction of the intestinal wall, and further to retention and what we now term intestinal stasis. To relieve this stasis these bands, membrane kinks and pouches must be obliterated.

It is astonishing to what extent in carrying out this principle you may and shall go. The uninitiated will see his marvel at such a proceeding. I do not use as much as one suture to the average case or apply more than one or two ligatures to bleeding vessels, in the most extensive division of such bands and membranes. The cutting is limited to transverse discission of tissue which is essentially adventitious, *i.e.*, scar formation, having only terminal, nonoscillating blood-vessels. Care is necessary to avoid

the normal tissues, but this is easily practised. All such tissue impeding bowel movement is cut until the bowel is absolutely free from such restraint. At the conclusion of such work the terminal ileum discharges its contents into the cecum at right angles as is normal. The cecum, so freed, may be found in an abnormally low position and is very loosely hung. But even within the short time that the patient is under observation in the hospital can be demonstrated by delicate palpation and percussion that the cecum has regained a higher, approximately normal position, and its wall be found free from the previous thickening (hypertrophied musculature). As to the ileocecal valve, its function returns practically at once to normal when the constricting bands are cut and the distorsion incident thereto is relieved. As to recidives, there are few and these commonly show the need of more cutting rather than the evidence of adhesions. I do not put in any oil to avoid adhesions. Why should adhesions form? When there is no undue handling of the parts, no infection introduced, and the bowel kept properly active after operation, such adhesions commonly have no occasion to form, nor if formed can withstand the effects of normal peristalsis for any time. The after-treatment has much to do with the success of the operation. I give a pint of fluid by rectum every four hours adding ½ to 1 dram of sodium salicylate to each enema for its eliminating effect, and a few drops of camphor to tranquilize the bowel during the feeding. Care is had to keep the solution at about body temperature. The drop method is employed, giving it as fast as can be borne without exciting the rectum to contract. The nurse is instructed to remove the nozzle every time the patient complains of colic in the lower bowel, and to have the patient discharge or where abdominal tenderness makes this impossible, to introduce a rectal catheter an inch or two for siphonage. Rectal feeding is then resumed at once. For gas pain and for distention of the abdomen upon its very lightest manifestation physostigmin one-fiftieth grain hypodermically is given at once, and followed fifteen minutes later by low Watkins. An alert nurse, following such directions, rarely, or practically not at all, will have develop gas pains or distention of degree that is distressing or menacing.

Dr. Frank D. Gray, Jersey City, New Jersey.—In the first place, I wish to express my satisfaction and gratification at the conservatism voiced here this morning by Dr. Crile. I think that he has cast an anchor to windward on a subject that some have gone wild over. Furthermore, I would like to say a few words in discussion of the last paper.

As Dr. Dickinson so truly says, patients who have to be reoperated dread the anesthetic and the subsequent gas pains. To those might well be added the preliminary preparation. The paper gave us an admirable résumé of the literature on the subject, and it wound up by offering a very practical method of relief which I have used in about the same way and with the same results that Dr. Dickinson spoke of. There is one thing that the paper failed to

emphasize and possibly rather deprecated, and that is the use of pituitrin. Pituitrin, when used in the presence of advanced meteorism, accompanied by gas pains, has but little effect. My plan—and I have found it referred to as Dr. Baker's plan, in the admirable address of our President this morning—is to systematically administer, or have it administered, pituitrin, in post-operative abdominal cases, using 1 c.c. hypodermatically every sixth hour for from twenty-four to twenty-six hours after operation and follow it with a purgative enema. I want to lay stress on a certain purgative enema which many of you may have used, and which was original with the late Dr. Nicholas Senn, of Chicago, and that is, milk and molasses enema, equal parts of each. My patients often call it dynamite. It does the work. To those of you who have not tried it, I would recommend it.

There is one peculiarity about these gas pains, that we do not always find them associated with meteorism. I have had patients now and then who complained of gas pains with a flat abdomen, so that there is something in the question of gas pains more than intestinal distention. I think if we will all endeavor to have our patients receive proper preparation, and I am coming more to the belief that much of it ought to be done on the operating table instead of beforehand, giving them a wise and sensible anesthesia, traumatizing them as little as possible and treating the gas pains somewhat along the line recommended this morning. If they should have to be reoperated, they will have less fear of the ordeal.

Dr. John W. Poucher, Poughkeepsie, New York.—I have been very much interested this morning in this discussion, and particularly in these papers on intestinal stasis, and I merely want to give an experience I had about a year ago with a patient. A young man, thirty-two years of age, was brought to me by one of my colleagues. He had become a nervous wreck; he was unable to follow any employment, and after examination I decided that his trouble was due to a toxemia brought about by intestinal stasis entirely. He was suffering from obstinate constipation and his nervous system was very much shattered. He had frequent epileptic convulsions, which he had acquired several years before. A series of *x*-ray pictures showed a very greatly distended cecum, with prolapse into the pelvis, and after careful consideration we decided to endeavor to relieve him by one of the operations for intestinal stasis. The operation we did was an ileosigmoidostomy, and with my limited experience with this operation the results have been remarkable. This young man had two convulsions while he was still in the hospital. This was ten months ago. He was discharged the fourteenth day, and since his discharge he has steadily improved. He has had no further convulsive attacks. He has increased in weight and in general health and is now holding a very important position and doing all his work satisfactorily.

I want merely to emphasize the satisfactory end result in this particular case. I have had but two of these cases, but I am so well satisfied with the results in this case that I thought it might be of

interest to report them here. It seems to me that the epileptic or epileptiform convulsions from which he suffered were, in all probability, due to the effect of toxic absorption from his intestinal canal.

Dr. Oscar H. Elbrecht, St. Louis, Missouri.—With reference to the subject of intestinal stasis, I desire to call your attention to the fact that Mr. Lane has brought this matter before the profession more than anyone else. I felt thoroughly prejudiced on this subject before I saw some of Mr. Lane's work. I felt exactly as the papers have brought out this morning, that we go into this matter with a prejudiced mind. I spent some time with Mr. Lane, and aid. the opportunity a few years ago of seeing a most unusual clinch During the International Medical Congress Mr. Lane lined up thirty-six of his post-operative cases for us and showed the results, and permitted anyone of us to talk to these patients on whom he had operated and allow them to tell their own story. I saw each case that was operated. I saw a case that any one of us would say it was suitable on which to do a colectomy.

Mr. Lane's work has been misunderstood. I for one felt that he had gone too far, but I do believe now that Mr. Lane is pushing back and coming back to practically what our American operators have done, that is, in doing resection of the ascending colon only. As you may remember, Mr. Lane first did ileosigmoidostomy, and then he went ahead and did colectomy. Now, I believe, he is swinging toward the position taken by American operators, that it is unnecessary to do a colectomy because in the majority of cases it is the large club-shaped cecum that is doing the work and not the transverse colon that is doing it. If you turn the fecal contents into the transverse colon it has a good chance to get down, but it has not got a chance to get out of the club-shaped cecum that is held down. To release the adhesions, as was discussed this morning, does not suffice for the class of cases that Mr. Lane is talking about. The one thing he tries to impress every one with is that he is not doing his work for chronic constipation, but rather to prevent toxemia, and one of the most common and prominent and constant symptoms that he dwells on was not brought out in these papers. You walk up to a patient even on a hot day like this and you find her hands are cold and clammy, and every patient he has operated on had that symptom, and yet after operation you can shake hands with these patients and find that they are warm and nice. These patients will have a healthy glow and good color of the skin. This is a direct index as to chronic toxemia.

With reference to small adhesions, I have seen abdomens opened in this country with a view to doing the same operation that I certainly would have closed up and felt that the cases were not suitable for operation for the relief of chronic constipation. In other words, there was not sufficient toxemia to justify that operation.

I feel that these papers are important in that they have sent out a note of warning which is absolutely necessary to guard against indiscriminate operating that has been going on in this and other

countries as the result of Mr. Lane's work being misunderstood, and operations have been done simply for chronic constipation instead of to prevent toxemias. All of us feel that something must be done to relieve this condition.

As to the end results of the treatment, I find in discussing the matter with these patients that they use the Russian oil with the greatest variability. Some of the patients will take as much as a pint a day without any inconvenience or disturbance. Mr. Lane says that the average dose of oil is nothing like the usual dose, or that was the dose they usually recommended. Mr. Lane does not know the dose for each individual patient. He says, give them the oil and let them work it out for themselves. It is not going to do them any harm.

Some one made reference to the point that two-thirds of the cases were not being relieved by surgical procedure.

Dr. Crile.—Three-fifths.

Dr. Elbrecht.—That tallies pretty well with Mr. Lane's results. Mr. Lane is not simply operating for the relief of constipation but for the profound toxemia that is present in these cases.

Dr. Crile (closing).—It seems to me that it is an odd fact that the human race only has intestinal stasis; apparently neither wild beasts nor domestic animals are affected by that disorder. I imagine that before we know what are the real causes of intestinal stasis we shall have to consider the relation to its causation of a far larger number of organs than at present we consider in that connection. One suggestion that occurs to me is the possible relation of the adrenals to intestinal stasis. We know that adrenalin inhibits contractions of the intestinal muscles. We know that the adrenal glands put out an increased amount of adrenalin in response to emotion, to worry, to fear, to anger, and that an increased output of adrenalin is produced by all infections and by indol and skatol. The specific action of adrenalin being inhibition of the activity of the intestinal muscles any one of these agents may prove to be the causative factor in a given case of intestinal stasis.

I would like to restate something in this discussion that our distinguished president referred to in his splendid address. I do not wish it to be understood that I advocate the opium treatment of peritonitis as a separate independent treatment, and nothing else. In this connection Alonzo Clark's article on opium treatment in Pepper's System of Medicine is most suggestive. In two cases out of a hundred of acute infection of the gall-bladder for example, or any other abdominal infection you will have a terrible struggle and will probably lose the patient. That is the kind of case in which every method of which we know to-day should be employed: enormous quantities of water; proctoclysis; large hot packs; the Fowler position and drainage. If in addition to all these measures you employ the Alonzo Clark opium treatment, you will be amazed to find how your desperate cases will pull through. Do not give small doses of opium, but large ones until the respirations are reduced to about ten or twelve per minute. You will then be astonished

to find how opium blocks the whole transformation of energy in the body and checks the normal processes. The patient will need scarcely any food but only water. The use of opium is continued only as long as the patient is in imminent danger.

Dr. Meeker (closing).—One cannot really get well started on the subject of intestinal stasis in twenty minutes. I realize that my paper was very incomplete. It has been my good fortune to assist Mr. Lane in some of his operations and to follow up some of the postoperative cases, the results in all cases were not absolutely satisfactory. Mr. Lane himself has had such wide experience, and is so dextrous, it is much easier for him to take out the colon than to attempt a peritoneal plastic repair. In fact he considers the delicate and painstaking work of relieving the constrictions and fixation caused by these bands, the more radical surgery.

It was gratifying to hear of the success Dr. Pantzer has had in following the principles of conservative surgery that have been brought to your attention.

Dr. Pantzer spoke of the value of giving saline solution by rectum. Saline solution is of unquestionable value, it seems however a better plan to anticipate the shock of operation by administering the saline solution during the operation, rather than after the patient has been put to bed. This may be done by hypodermoclysis, from two to four pints of normal saline solution being injected under each breast. In this procedure the amount of fluid absorbed can be accurately determined and does away with the unpleasant experience of having a large amount of unabsorbed fluid expelled in the bed after a rectal drip has been in operation for several hours.

The technic of this is simple; after cleansing the skin just above the breast, it is lifted, putting it on the stretch. The needle is inserted so that it passes over the fascia of the pectoralis major into the cellular tissue beneath the breast. When the needle is in proper position its shoulder should be resting over the center of the concavity of the acromial end of the clavicle, while the point is directed toward the ensiform process. The tubing is then out of the way of the operator and anesthetist and there is no dragging upon the needle. When the needle is inserted from the axilla the tube is in the way of the operator and very apt to become kinked, the needle is likely to be pressed upon by the surgeon or an assistant and its tip then makes a lateral tearing of the tissue, thus inviting hemorrhage, there is also less likelihood of the needle being thrust into the muscle tissue, when following the facial plane from above downward.

In regard to the abdominal support, the principle of the Curtis spring support, recommended by Mr. Lane is an excellent one, but there is great difficulty in getting patients to wear it unless they do so to please the doctor. One woman's expressive opinion of this type of support, was that it was, "heaven in front, but hell in the back." (Laughter.)

Dr. Dickinson (closing).—My experience is that some men are born leaders, while others follow the leaders, and inasmuch as I am not a leader I must necessarily be a follower.

I have always felt that the Laneites were in the right pew but in the wrong church, and from the acknowledgments that have been made here to-day I should say that they are not quite happy. If they love physiology and psychology as much as Crile and I do, they would find something in Auerbach's plexus and would stop cutting out colons and giving oil. I prefer to give these patients horse bran. I like it better than oil, for the reason that oil slips through and spoils the linen, while the bran does not.

OBSERVATIONS ON MALIGNANCY OF THE UTERUS. DEMONSTRATION OF SPECIMENS.

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(With six illustrations.)

Specimen No. I (Fig. 1).—Dermoid cyst with balls or concretions of sebaceous material.

Mrs. C. E. R.—Operation March 18, 1911. Right salpingo-oophorectomy and appendectomy. Dermoid cyst size of an infant's

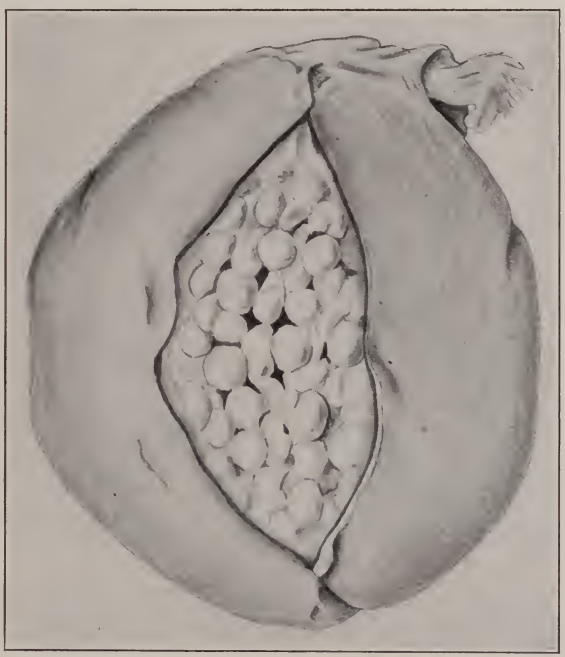

FIG. 1.—Dermoid cyst with fatty concretions.

head with torsion of the pedicle. Intestinal and omental adhesions. Specimen is of interest on account of its containing innumerable balls or concretions of a sebaceous character, ranging from the size of a pea to a marble, and independent of each other. The case was described by Dr. J. W. McMeans in the AMERICAN JOURNAL OF OBSTETRICS, vol. lxx, July, 1914. The cause of the peculiar formation is rather obscure, but in all cases in which the condition was found, an inflammatory condition was present.

Specimen No. II (Fig. 2).—Fibroid tumor of the uterus and dermoid cyst of the right ovary with almost complete calcareous degeneration of its wall.

Miss I. B. F.—Operation January 8, 1915. Fibroid tumor of the uterus and calcareous dermoid of right ovary. On account of the calcareous degeneration of almost the entire cyst wall, forming a complete shell, this specimen is of unusual interest.

Specimen No. III (Fig. 6).—Ectopic gestation of four and one-half months' duration. Operation May 13, 1915.

Mrs. J. V., aet. thirty-three, married fifteen years, two children, the last was stillborn at the eighth month, eight years ago. Has

FIG. 2.—Fibroids of uterus and dermoid of right ovary with complete calcification of cyst wall.

not menstruated for four and one-half months. Four months ago the patient had sudden and violent pain in lower abdomen which confined her to bed for one week. Two weeks later she was compelled to go to bed again and remained there for six weeks. She complained of a feeling of weight in lower abdomen. Since then she felt well until a few days prior to the operation when she experienced moderate hemorrhage from the uterus and pain.

Operation.—The conditions by which I was confronted necessitated a hysterectomy and bilateral salpingo-oophorectomy. The pathologic conditions consisted, on the right side, of an extra uterine pregnancy of about four months' development. A female fetus was found deep in the culdesac; its head was so firmly adherent in the pelvic cavity that during its delivery the skin of the

scalp and forehead was almost entirely torn away and its neck badly lacerated. The gestation sac, which included the tube, was the size of a large grape-fruit. For 2 inches the proximal end of the tube was thickened and patulous. The sac had ruptured low down posteriorly, and through this opening the fetus had been extruded into the abdominal cavity where it was found among the intestines. The placenta had a tubal attachment. The uterus was enlarged, soft and displaced to the left. Left uterine adnexa were markedly distorted by a large cystic tumor posterior to the broad ligament. This contained bloody fluid, probably a hematocele resulted from the primary rupture. The left tube was greatly elongated and the ovary deeply imbedded in adventitious tissue. The intestines and omentum were firmly adherent to the sac, hematocele and in part, to the fetus.

FIG. 3.—Carcinoma of corpus uteri and hydrosalpinx.

Pathologist's Report.—A uterus with an enormously enlarged Fallopian tube representing four and one-half months' tubal pregnancy on one side, a fetus, and the adnexa of the opposite side. The gestation tube measured 13 cm. in length, 15 cm. in depth, and 8 cm. anteroposteriorly. The fetus measured 25 cm. in length. The umbilical cord was 40 cm. long. Uterus measured 7.5 in length, 7 cm. from horn to horn, 3.8 cm. in thickness. The left tube, like the right, was 13 cm. long and 1.4 cm. in diameter at the ampullar portion. The left ovary measured 5 cm. by 2.5 cm. by 5.1 cm. The ectopic tube was a very large, solid, globular mass, presenting a ragged, intensely congested, outer surface which was covered by numerous fibrinous and fibroid tags, bands and strings of lacerated

adhesions. The tube was torn in its lower region showing a very ragged rent, forming a rough and oval opening of 6 cm. by 5 cm. Protruding from this tear was the small umbilical cord and shreds of fetal membranes. The lower thick edge of the rounded, reddish placenta also projected a little beyond the ragged margin of the tear. The umbilical cord, 40 cm. long and 5 mm. in thickness, was almost entirely outside of the gestation sac. The cord was torn transversely. A large oval window 6 cm. by 5 cm., with the flap turned down, was situated about the center of the posterior surface of the tubal sac, and showed a large placental mass, and fetal membranes.

FIG. 4.—Carcinoma of corpus uteri with fibroids and simple cyst of ovary.

At the operation the fetus was found free within the pelvic cavity, bound down at the head, and very much distorted; though all of its parts were quite distinct. Its neck was badly lacerated; the skin of the scalp and forehead were almost entirely torn away. Over the back of the head, the shoulders and the abdomen, there were numerous and firm adhesions. The fetus was rather well developed, but much distorted; its face looked congested, as though contused, especially on the right side.

The posterior surface of the uterus was covered by broken-up adhesions. The uterine cavity was patent and slit-like, showing a mucosa of a light yellowish-brown color. The left adnexa were cov-

ered by a very tough, quite thick, blood-stained and ecchymosed fibrous membrane, the remnant of a hematocele; it was a torn, but large sac-like pouch, which was torn and covered all of the posterior and small part of the anterior surfaces of the ovary. The fimbriated extremity of the tube formed part of this sac-wall, was seen to open on its outer side and showed a wide patent mouth with distinct fimbriæ knitted together.

FIG. 5.—Sarcoma of corpus uteri with calcareous infiltration of malignant mass and fibroid.

General Remarks on Malignant Neoplasms of the Uterus.—We have recently looked over our cases of malignant disease of the uterus with a view to determine, if possible, the relative frequency of sarcoma and carcinoma of the body of the womb and that of the cervix. Of 220 consecutive cases of malignancy, we have found twelve cases of sarcoma of the uterus, or 5.4 per cent. The proportion, ordinarily given, is from 2 to 3 per cent. Of the 208 cases of carcinoma of the uterus, 152 were carcinoma of the cervix and 56 carcinoma of the body of the uterus, or 26.9 per cent. The number of cases of malignant diseases of the body of the uterus was 68 or 30.9 per cent. This would verify a contention, made some time ago; first, that sarcoma is more frequent than is usually supposed; and second, that the proportion of carcinoma of the body to that of the cervix is much greater than is generally given. Many

of our text-books give the proportion from 1 to 8 or 1 to 12. In our experience, the proportion is almost 1 to 4. This list does not include some late cases in which it was impossible to decide the starting-point with absolute certainty.

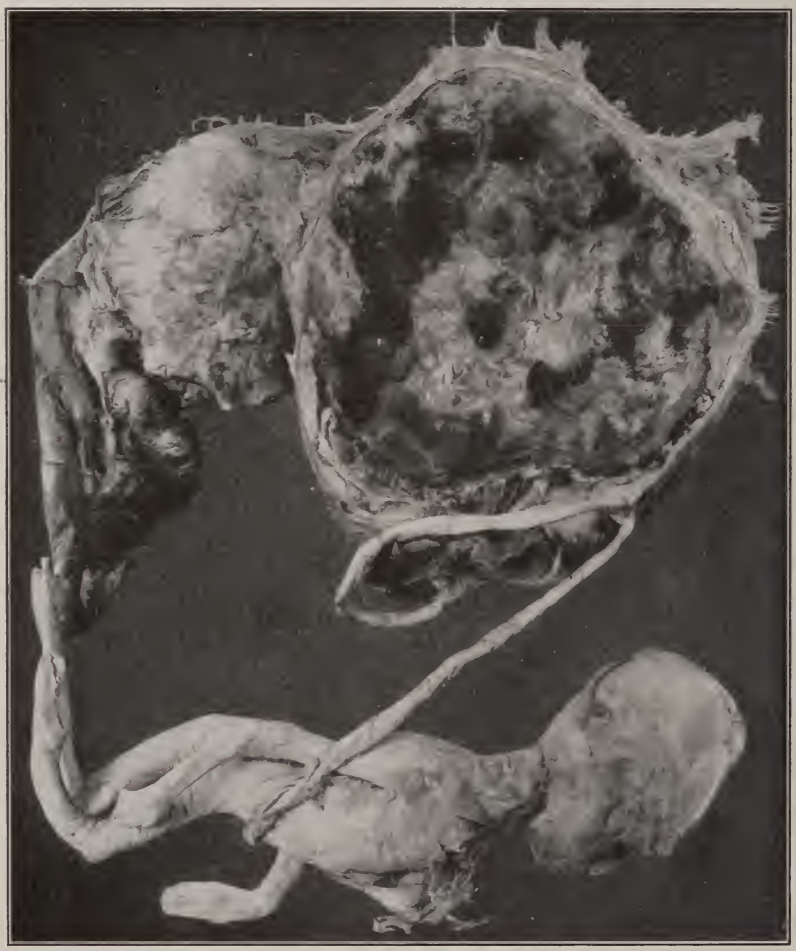

FIG. 6.—Ectopic gestation of four and one-half months.

The complication of fibroid with carcinoma and sarcoma has been so frequent in our experience (I am not prepared, at this moment, to give the exact proportions) that I have made it a rule for a number of years, especially in women past the climateric age, to either curette or, of late years, to open the cavity of the uterus to make sure that no malignant complication exists.

In specimen XI, Fig. 4. School teacher, virgin, forty-six years old, this precaution for some reason was omitted and a supravaginal hysterectomy made. After the completion of the operation the specimen was opened and well-developed carcinomatous change was found in the fundus. It was too late to remove the cervical stump. The case has, however, been carefully watched since the operation. A year has elapsed since then without new evidence of the disease. Fortunately the malignant neoplasm was a considerable distance away from the cervical stump which was left in this patient. This experience emphasizes the point brought out above, that is, to make it a rule to *examine the uterine cavity in all women in whom a hysterectomy is made for fibroids and who are near or within the climacteric age, before closing the peritoneal cavity.*

Specimen No. IV (Fig. 5).—Sarcoma of corpus uteri and fibroid. From Miss S. P., aet. sixty-five. Operation March 19, 1915. Uterus size of grape-fruit, its cavity filled with large amount of necrotic malignant tissue. In the center of this mass was a hard calcareous spot. The sarcoma seems to have had its starting-point in the fibroid.

Specimen No. V.—Carcinoma of corpus uteri. Mrs. E., aged forty-eight. Multipara. Operation January 31, 1913.

Specimen No. VI.—Carcinoma of corpus uteri. Mrs. W., aged fifty-eight. Multipara. Operation May, 1913.

Specimen No. VII.—Carcinoma corpus uteri. Mrs. B., aged fifty-six. Never pregnant. Operation September 9, 1911.

Specimen No. VIII.—Carcinoma corpus uteri. Mrs. P., aged fifty-six. Multipara. Operation February 1, 1915.

Specimen No. IX (Fig. 3).—Carcinoma corpus uteri. Mrs. H., aged forty-six. Operation September 3, 1915.

Specimen No. X.—Carcinoma corpus uteri and ovarian cyst. Mrs. B., aged fifty-three. Never pregnant. Operation August 7, 1915.

Specimen No. XI (Fig. 4).—Carcinoma corpus uteri with fibroid and simple cyst of ovary. Miss C., aged forty-six. Virgin. Operation October 31, 1914.

Operation.—Abdominal hystero salpingooophorectomy.

Pathological Report.—Fibroid of uterus size of an orange, composed of two small fibroids. Cyst of left ovary size of lemon filled with bloody fluid. On section; carcinoma of fundus was discovered on posterior wall of fundus, covering the area of a silver dollar and extending about 1 cm. into muscularis wall.

Specimen No. XII.—Carcinoma and fibroma of corpus uteri. Mrs. M., aet. fifty-one. Multipara. Operation September 18, 1914.

For last two years almost constant bleeding. Malignant mass situated in posterior wall and involving almost the entire uterus and extending through to serosa at a point near the right cornu. Several enlarged glands in right pelvic wall were removed and showed metastatic carcinoma.

THE USE OF LUTEUM EXTRACT IN THE TREATMENT OF MENSTRUAL DISORDERS.

BY

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Portland, Maine.

When one essays to present a dissertation, no matter how brief, on the topic of corpus luteum therapy, it is at least assumed that he possesses some special knowledge of the subject, which, in all probability, is the result of extensive observation or investigation. In this instance, however, such is not the case. I have incorporated herewith little of scientific value or true originality.

A discussion of the time-worn text-book subjects of amenorrhea, dysmenorrhea and other phases of altered menstrual flow, and a consideration of the relation of these symptoms to certain underlying pelvic or constitutional conditions, would be decidedly boresome, hence it is my intention only to offer, in an epitomized form, a few case histories embracing the result of personal experience with the use of luteum extract, combined with a small amount of comment as to the indications for its administration and the limits of its action.

To the corpus luteum is attributed a twofold action: First, of preventing the formation of an excess of scar tissue in the ovary, following follicular rupture and ovular expulsion; and, second, of subsequently elaborating an internal secretion.

As a result of an extensive series of experiments, it has become a well-established fact that this internal secretion exercises an important influence upon the sexual cycle, such as causing the phenomenon of menstruation, controlling the nutrition of the uterus and, if pregnancy occurs, probably aiding in the attachment of the ovum to the wall of the uterus by causing the endometrial changes which characterize the decidua. It seems also to influence the physical development of the woman and bears a distinct relationship to the other body glands of internal secretion, thereby aiding in the maintenance of normal metabolism.

Some years ago, acting upon the assumption that the ovary harbored this action, an immense amount of interest was taken in the possibility of successfully treating with ovarian extract, certain gynecologic disorders which could be theoretically attributed to hyposecretion of this organ. Little benefit was gained, however, in these

cases for the obvious reason that we now know that the ovary, as a whole, did not furnish this active principle.

Following the valuable demonstration of Fraenkel and Loeb, enhanced by the reports from such men as Burnam, Kelly, McDonald and others, the corpus luteum extract supplanted the ovarian extract in therapeutic use and now we are well agreed as to its efficacy where there are certain given indications.

Its chief field of usefulness seems to be, (1) in the treatment of functional amenorrhea, (2) the neuroses of the natural, artificial and premature menopause and (3) in those cases which come under the head of the so-called "ovarian deficiency" type, occurring during menstrual life.

In this last class, dysmenorrhea should be especially included. In my own private practice I have observed, in a truly extraordinary manner, the cure or relief of many such cases through the medium of this type of organotherapy. My best results, however, have been gained in the administration of corpus luteum for the relief of the severe nervous symptoms attendant upon the menopause of both the physiological and artificial varieties and the functional amenorrhea of young women.

As illustrative of the action of corpus luteum in functional amenorrhea, I have two cases of interest which I should like to describe briefly: The first case is that of a young school girl, aged fifteen, who consulted me in November, 1914. She had first menstruated two years before this time. Six months had elapsed before the next period appeared. She menstruated but three times in the following year and when I first saw her, the history given was of amenorrhea for a period of nearly four months. Her weight was 196 pounds, and she had gained in weight rapidly during this time. She was very nervous, irritable and depressed. She had given up school because "it worried her so much." The appetite was good, but she complained of much disturbance of digestion. I commenced treatment by giving her luteum in the dose of 10 grains, three times a day. Three weeks later she menstruated normally. At this time I added thyroid extract in the dosage of five 2-grain tablets a day. She has continued the use of these two extracts up to the present time, with but one short intermission and a slight decrease in the dosage of the luteum extract. When last seen, on the second of this month, after having returned from a stay in the country for the summer, she weighed 167 pounds, a loss of 29 pounds, and has menstruated regularly every five weeks since the treatment was begun. There is absolute cessation of the nervous and digestive symptoms.

The next case is of a similar nature: A young married woman, aged nineteen, consulted me concerning arrangements for her confinement which she anticipated in another month's time. She gave a history of amenorrhea for eight months; during this time she was "sure she felt the motion of the child." On casual inspection she certainly looked the part of a pregnant woman; but upon examination she was found to possess a small infantile uterus and a hypoplastic condition of the genitals. An enormous deposition of fat was evident, especially on the abdomen and in the breasts. The hemoglobin about 70 per cent. She was drowsy, asthenic, at times exceedingly nervous, and has experienced violent attacks of tachycardia on several occasions. Blaud's mass by mouth and iron citrate by injection, *plus* corpus luteum (30 grains a day) was prescribed. Her general and nervous condition gradually improved and menstruation appeared shortly thereafter. I saw this patient regularly for four months. During this period she menstruated four times with fairly normal intervals. I have had no opportunity to see her since.

In these two cases we have conditions of distinct similarity. While it is evident and granted that there was ovarian insufficiency present in both instances, one must consider diminished pituitary function in the second. Here were present the various symptoms which would point to probable hypopituitarism with the resulting progressive general obesity associated with atrophic changes in the genitalia. No doubt, too, there was abnormal secretion of the thyroid which would explain the nervous symptoms. As Bandler states it, "if there is a diminution of the ovarian and thyroid activity and the ovarian activity is so diminished that a relative degree of thyroid hypersecretion exists, we have, in addition to the increase in weight, an excitable condition due to this thyroid hypersecretion."

There is no doubt that some cases of obesity with amenorrhea are due to ovarian inactivity; some are due to diminished thyroid function; many are of the so-called hypophysis type and, in all probability, many are due to an involvement which includes failure of function in more than one of these glands; as is illustrated in the cases just mentioned.

In the neuroses of the surgical and natural menopause, as I have said before, the corpus luteum therapy plays a most important part. The nervous, digestive and circulatory disturbances of the climacteric may be frequently controlled by its use. Likewise its efficiency in controlling similar symptoms, following hysterectomy and oophorectomy, has been repeatedly demonstrated. I consider it a necessary adjunct to the treatment of such cases.

Two years ago I removed the right tube and ovary from a woman in whom a ruptured tubal pregnancy on the opposite side had occurred a year and a half previously and, at which time a salpingectomy and oophorectomy was done on the left side. Shortly after my operation she experienced all the extreme and disagreeable symptoms of the climacteric to such an intense degree that her work, as a dressmaker, was greatly interfered with. No relief was obtained until she began the use of corpus luteum. Thirty grains a day soon brought about complete cessation of the symptoms. She still continues the use of the product in decreased dosage and can dispense with its ingestion for considerable intervals of time without experiencing any immediate return of discomfort.

In the treatment of those patients who, during their menstrual life, show severe nervous phenomena such as irritability, malaise and depression, accompanied by headache and scanty menstruation, corpus luteum is obviously indicated. It is really astonishing to see how quickly there is a change for the better. How often, too, do we see patients who suffer with dysmenorrhea, presenting this same train of symptoms, indicative of insufficient ovarian function.

This brings me to the subject of dysmenorrhea. I do want to make mention of my small experience with this condition in relation to my experience with corpus luteum extract as the remedial agent. The results gained by corpus luteum therapy, as applied to dysmenorrhea, have been far from remarkable, although the reports of some observers show its undisputed value, when utilized in those cases where functional ovarian deficiency is present. I have used it with varied results, but the recital of two cases of dysmenorrhea, in which absolute relief was obtained through its use, should have some weight in the consideration of this subject.

The first case was that of a married woman, aet. thirty-two, who had suffered intense pain at her periods ever since menstruation made its appearance. She had never been pregnant. The flow was normal in amount and occurred at regular intervals. I used every method known to me to relieve the condition. I confess that I often resorted to morphine. She experienced this pain only on the first day of the flow. She had an acutely anteflexed uterus with apparent cervical stenosis. I performed a dilatation and posterior division of the cervix, but no relief followed. I tried corpus luteum, giving her one 5-grain tablet three times a day; increasing to two 5-grain tablets three times a day, a week or ten days preceding the period. At first no appreciable relief was observed, but, subse-

quently, she menstruated almost painlessly. This was in the Spring of 1913. I have since received word from this patient, stating that she still uses the corpus luteum tablets, and that she has no pain at the time of menstruation. Relief after seventeen years suffering!

I have a parallel case in a woman, aged thirty, a semi-invalid, who is thin and poorly nourished. Her menstruation was regular but scanty, and she had always suffered much pain on the first day of menstruation. The pelvic organs are seemingly normal. Fifteen to thirty grains of lutein extract a day has relieved the pain almost entirely, increased the flow and bettered her general condition. These are but two of a dozen such cases which I have in mind, but they are sufficient to illustrate my point.

The fact that dysmenorrhea is oftentimes amenable to this therapy allows for some interesting theorization as to its exact mode of action. The ovarian secretion is responsible for menstruation. That is a well-proven fact. We also know that the result of this action is a periodic hyperemia of the uterus, and thickening of the endometrium followed by diapedesis of erythrocytes, rupture of dilated capillaries and the formation of small hematomata; this is again followed by rupture of the subepithelial hematomata and exfoliation of small portions of the uterine mucosa. Yet this description does not fully cover the action of the ovarian internal secretion. To illustrate, let us take an analogy from the alimentary system. Inasmuch as we know that the hormone of the duodenum, called secretin, passes through the blood stream to the pancreas and there stimulates the acinar cells to pour out their enzymes, so it is quite possible to believe that the ovarian secretion acts as a hormone in the uterus. In addition to acting as a vasodilator of the uterine capillaries, it has perhaps a further selective action in exciting or stimulating an intracellular or autolytic enzyme in the endometrium, which so softens and digests the histological elements of this tissue that the physiological phenomena, previously described (namely, diapedesis, rupture of hematomata and exfoliation of mucous membrane) are made possible and easy, thereby constituting normal menstruation.

Such a theory as this furnishes for me an attractive explanation of some cases of dysmenorrhea of the so-called congestive or membranous type; for, where the ovarian hormone is altered or lessened, it may fail to excite in sufficient amount the uterine autolytic enzyme with the result that the endometrium, lacking its proper preparation and softening, acts as a barrier to an easy escape of blood; the

congested membrane either remains to form a foreign body and set up uterine spasm, or becomes detached in the comparatively large portions that are characteristic of membranous dysmenorrhea. For this reason, I put forward the suggestion that the cases most suitable for the administration of corpus luteum are those which are characterized by excessive first-day pain, with scanty discharge, suggestive of an intense unrelieved congestion, usually followed later by a free flow and immediate relief of pain.

From my little experience, I am certain that there are cases of dysmenorrhea in which the main causal factor is deficient action of the natural corpus luteum. I am not carried away with the idea that the therapy of corpus luteum is a "cure-all" in any sense of the word; on the other hand, the cases which may be traced to ovarian deficiency are probably in the distinct minority. One must not allow himself to be so impressed with the etiological value of some one factor in the cause of disease, that he forgets, or becomes indifferent, to other factors of equal importance.

Surgery is necessarily indicated in those cases where we find pelvic pathological conditions or anatomical abnormalities, which we are wont to consider as the probable causes of dismenorrhea. Too often, however, do we resort to operation and, consequently, too often are we disappointed in the results, because the defect is not surgical but glandular. Again more often than one would think, is organotherapy indicated in conjunction with surgical intervention.

There are some serious drawbacks to the use of corpus luteum. It generally has to be used routinely or continuously to obtain and to maintain results. Its cost hinders its more frequent administration. Its action is not immediate, it is cumulative; for that reason patients, and we ourselves, too often discard its use after a short trial, if it has been unproductive of good results.

As regards its dosage, I find that from 15 to 30 grains a day, seldom more, is sufficient in any case. Its prolonged administration has not brought about any untoward symptoms in my cases; with, perhaps, the possible exception of slight gastric disturbance in one or two instances.

The subject of organotherapy, in its present experimental state, is rather involved and indefinite, and while it is sometimes difficult to recognize and identify the cases which would be benefitted by corpus luteum, yet when there is a possibility of "ovarian deficiency" being an etiological factor in any gynecological disorder, we owe it to the patient to make use of this remedial agency, for its value is well determined.

DISCUSSION.

Dr. D. Tod Gilliam, Columbus, Ohio.—I have only one or two remarks to make. The first statement made by the essayist is admirable and one which should teach us a good deal. There is one feature he has not mentioned, and which as I believe is very important, namely, you must give it for its physiological effects. Until you see evidences of diminished blood pressure. I do not think you have got to the point where you ought to stop. I have had experience with the luteum extract, both favorable and unfavorable, and in the revision of my work on gynecology I have given it a kind of black-eye; nevertheless, I have had some elegant results from it, especially when carried to its physiological effects and maintained for a while.

Dr. J. Henry Carstens, Detroit, Michigan.—The very modest paper which Dr. Leighton has read is a help to us in showing some of the things that we can do to assist these peculiar cases, but there is this thing about it: The patient to whom he gave this extract was relieved for ten days, showing that we must keep on dosing them all the time. If the gentleman in some of these cases will introduce a silver stem pessary, about which I have spoken time and again, and I am sorry I have to hammer this in, he will not only develop the uterus, he will not only keep it open and prevent spasmodic dysmenorrhea, but he will stimulate the growth and development of the uterus, which is generally an infantile uterus more or less, and he will also stimulate the growth and development of the ovaries, and as a result the patient will have plenty corpus luteum secretion and a supply of ovarian secretion, and if she should wear a stem pessary for six months she will be absolutely cured without medicine because she will then have normal pelvic organs.

Dr. Arthur Thomas Jones, Providence, Rhode Island.—With reference to organotherapy, I think the profession is divided into two classes. As a rule, one class loses its head over organotherapy and believes everything can be cured by organic extracts. The other class is that group who would not give organic extracts if they knew they were going to get a good result. They will not take it up; they never have tried it. I believe these extracts are of value, and particularly the corpus luteum extract. I have had considerable experience with the use of lutein tablets, particularly in cases of surgical menopause. I have always used the tablet of Hynson, Wescott & Co. We are too inclined to say, "oh, well, we do not have many cases where the artificial menopause is troublesome," and we dismiss it with very little thought, but we do occasionally have a case in which the symptoms are very distressing. I recall one case in particular in a young woman upon whom I did a hysterectomy and had to sacrifice both ovaries that were badly diseased. The symptoms in that case were particularly distressing and the girl was almost driven to suicide. The doctors in the country were talking about sending her to a sanitarium for treatment. After two weeks use of the luteum extract that girl's mental condition cleared up, and she resumed her work in one of the jewelry

factories, was perfectly comfortable and well so far as mental symptoms were concerned.

I have had any number of cases in which there were flashes of heat or bad perspiring spells, and I have found that the luteum extract will control these very nicely. We ought to give this a trial, particularly those who are doing surgery and have to sacrifice both ovaries. You will give your patients great relief. In cases of amenorrhea the results are pleasing; you will likewise get good results in cases of deficient menstruation, and in a short time they are having good normal menstrual periods in many cases.

Dr. O. H. Elbrecht, St. Louis, Missouri.—I want to call attention to one thing in connection with these tablets which I have been using for six years or more. I am not here to advertise any particular manufacturing firm, but this is true of corpus luteum as was brought out in the doctor's paper. At first, we were using simply the desiccated ovarian extract, commonly called the ovarian extract, which has been proven to be practically inert. The next step was the beef extract put out by a certain pharmaceutical company. At that time I had several cases on hand and I told this firm I would be glad to use their product if it proved efficacious. They furnished it to me, but having very little faith in it, I gave it to these patients *ad libitum* with no results. I am free to say, however, that the tablets of Hynson and Westcott, which are made from the corpus luteum of the pregnant sow are an efficient product. I have also had failures as well as good results. Where there is no hyposecretion you have got to feel your way in using so harmless a method. But just as the essayist has reported, I succeeded in bringing about menstruation in a young girl who had missed menstruating for over a year. In that instance I used twelve 5-grain tablets each day. The only objection to it is the fact that it costs considerable money. I think these tablets are worth something like $2.50 per bottle, and as soon as you get into giving large doses the patient will complain of the price of the treatment. There is no question but that form of luteum is excellent, and if you cannot give it in the prescribed doses and continue it, you might just as well prescribe something else. Unless you prescribe the luteum made from the pregnant sow you will not get results. The Hynson and Westcott tablets, recommended highly by Burnham and Kelly, are efficient, but higher in price. Parke, Davis and Company are following that plan and if you want to use tablets or capsules you can prescribe them, but they admit that their ovarian extract is not as successful as the other.

There is another form that has not been referred to which is given in hypodermic solution, which is in the experimental stage, and I would like to ask Dr. Schwarz to say something about that. But it strikes me, if we want to get active results by hypodermic administration why not use it that way. If it can be put up in sterile solution in acceptable form, why not use it in that manner? I have used it in the same form in the case of an obese woman, thirty-two years of age, allowing her to use it *ad libitum*, with no results.

Dr. Orange G. Pfaff, Indianapolis, Indiana.—I dislike very much to advertise anybody's preparations, but I understood Dr. Elbrecht to say that the capsules of Parke, Davis and Company had proved in his hands inert. I do not know what changes they have made, but previous to the last six months I have used Parke, Davis and Company's corpus luteum capsules, and whether it was a coincident or otherwise, I have learned to think that we have found something of an ovarian stimulant or ovarian tonic, or whatever we may call it, because in a great many cases—at least in a number of cases—in my hands, especially in those young women attending boarding schools and who are in the developmental stage, with scanty and sometimes absent menstruation, I failed to get any results with the so-called emmenagogue list, but by using these capsules put up by Parke Davis and Company I have had quite a number of charming and delightful results in every way. Possibly they may be looked upon as coincidences, but I doubt it. I have also used the tablets and have had the good results spoken of. I think very frequently we get utter failures perhaps on account of not selecting cases properly, but I must say that I have had very good results from the use of these capsules.

Dr. Gordon K. Dickinson, Jersey City, New Jersey.—We are still worshipping at the shrine of Lane and why not give the prostatic extract he speaks of.

Dr. Hugo O. Pantzer, Indianapolis, Indiana.—It is only such a paper as Dr. Leighton has given us, reporting cases having had methodical treatment, that will bring order out of chaos. Perhaps nothing has been adduced in recent times that has been of more interest to the subject under discussion than the work during the last two years of Schroeder of the Rostock University. Both by animal experimentation and studies on the human to the fullest extent that this was possible, Schroeder, at last, has developed the scientific basis of menstruation. He shows conclusively that ovulation occurs at the fourteenth to the sixteenth day. Then the uterine mucosa takes on activity. The uterine mucosa, as is long known, desquamates from the first to the fourth day of the ordinary twenty-eight days' menstrual cycle. Then it regenerates itself and up to the sixteenth day is inactive. Under the influence of ovulation on the sixteenth day, the endometrium begins a secretory activity which in turn stimulates the corpus luteum formation, which completed on the twenty-eighth day, eventuates in desquamation and appearance of the monthly flow. To take up the cycle methodically, desquamation occurs the first to the fifth day, regeneration of mucosa from the fifth to the sixteenth day. Ovulation takes place on the fourteenth day, and secretion in the mucosa is established by the sixteenth day and the corpus luteum of menstruation begins its development, which matures at the close of the twenty-eighth day. This matter has pertinency here to the extent that the knowledge of this function would clearly indicate that the administration of the corpus luteum extract shall be with regard to the time and purpose of nature, namely, between the sixteenth and twenty-eighth day.

Dr. Leighton (closing the discussion).—I am very glad that my paper has elicited such a free discussion. With reference to the remarks made by Dr. Gilliam concerning blood pressure, I will say that I never had any untoward results such as a sudden drop in the blood pressure subsequent to the continuous use of the luteum extract. If it should drop 15 millimeters, it is time to discontinue giving the extract, but I have seen no such happening. The girl of whom I have spoken who had been under treatment since November, 1914, with the exception of one slight intermission, had no untoward symptoms whatsoever, and I have been careful to take the blood pressure at different times.

This therapy has its limitations, there can be no doubt about it. It is not a cure-all. There is one trouble, and that is, we do not use it enough! It is absolutely nontoxic. If we can get results with it, it is worth almost any price that it may cost. As one patient said to me, "if it should be $15.00 a bottle I would want it." She was cured, and if we can get such results in patients who are otherwise unaided, it surely is worth it. One of the reasons why there have been so many failures is because it has not been used sufficiently. Some patients have used a hundred tablets and have then left off using them at a time when they were beginning to get results. I have used the Hynson and Westcott product altogether, with one exception, and that in the case of the girl just mentioned, where I used Armour's tablets as well as thyroid extract. Undoubtedly the Hynson and Westcott tablets from the sow are the best. Burnam and Kelly have recommended very highly the use of these tablets.

THE PRESENT STATUS OF TWILIGHT SLEEP IN OBSTETRICS, BASED UPON A COLLECTION STUDY OF OVER 2000 CASES.

BY

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New York.

It is now one year since I presented a preliminary report on the use of scopolamine in obstetrics according to the technic as described by Gauss. In that report I stated, "Judging from our experience and observations we feel that this method of treatment should be given a fair trial. It is only a varied experience by competent men that will tend to settle this extremely interesting subject. It is the duty of the medical profession to set the public aright on this most important question. We must approach this subject both from a medical and humane aspect. If pain can be relieved, it is the duty of the physician to do so, and no effort should be spared to accomplish it."

The demand made by women of all classes for this form of treatment made it possible to make further observations and to apply this treatment not only to hospital ward cases, but also to a great number of women of a higher social strata.

As our experiences accumulated, we soon discovered that this form of treatment is best carried out in primiparæ, or in multiparæ in whom we have reason to suspect a tedious labor, and that it has no place in short labors. This, together with the fact that both mother and child require most careful watching, I pointed out very strongly at the February meeting of the section of Obstetrics of the New York Academy of Medicine.

In April I had the privilege to report my experience, based upon a study of 300 cases, at the annual meeting of the New York State Medical Society. I then stated: "In our enthusiasm we have overlooked the most essential fact in the entire procedure, namely, that twilight sleep and painless labor are not synonymous, and that in a large number of cases pain is actually influenced but little. Furthermore, the degree of pain bears no relation to amnesia."

We, as obstetricians, are now confronted with the problem of deciding scientifically whether a patient, manifesting the usual signs

of pains during labor, even though she has no recollection of it subsequently, is actually suffering; or are these manifestations of pain transient in character leaving no permanent impression. We, too, must decide whether we are to judge the intrinsic value of this form of treatment from the standpoint of analgesia or amnesia. When administering this form of treatment, are we justified to accept labors as "painless" in which patients give expressions of pain and extreme suffering? I fully realize the many physiological and psychological problems involved, but it behooves us, as men of science, to settle this important question, in order that it may occupy its proper place in therapeutics. To bring the subject to a practical conclusion, may I ask you to direct your discussion to this question: *Is labor to be considered painless because the woman fails to recollect?*

In reviewing the history of obstetrics, we find that various therapeutic measures have been used, from time to time, to allay the pain accompanying labor; but, in most instances, the results were such that their adoption was in a general way impracticable. To Gauss must be credited the introduction of a method by which he obtains a state of seminarcosis with the use of scopolamine-morphine. His technic is definite, and the results obtained by him are more or less uniform. Gauss maintains that the method essentially consists in reducing the mother to a condition in which she still has nerve perception, but not mental perception. The mental state induced is not a loss of memory of previous events, but the inability to recollect what is transpiring while under the influence of the drug.

Clinically, the first sign of the action of the drug is pronounced weariness, which very soon passes into a quiet sleep occupying the whole of the intervals between the pains. During the uterine contractions, however, the patient is startled from her sleep, and apparently gives expression to pain. With the progress of the intoxication, thirst, dry throat with parched lips and flushing of the face are observed. Occasionally slight twitchings and motor restlessness takes place. After a longer action and sufficient dose, the sleep becomes deeper, so that even during pains, the patient does not become fully awake, and the only manifestations of pain is the contortion of the facial muscles and slight groaning, but consciousness is, even at this stage, fully retained. This state must be evenly maintained by skillfully graduated dosage so that a cloudy, befuddled mental condition, the principal characteristic of which is a complete amnesia extending over the whole process of birth, is obtained.

In order to make a more comprehensive study of this method of treatment, I have endeavored to obtain all the available material by addressing a circular, in the form of a questionnaire, to obstetricians, throughout the country. I have been fortunate in receiving replies which, in the aggregate, give an experience of 2000 cases which will form the basis for this paper.

In gathering the statistics on this subject, it was my purpose to bring forth a discussion of the advantages and disadvantages of this form of treatment, and in this way crystallize the American medical opinion concerning it; so that the question of "Twilight Sleep" may, in a measure, be definitely settled. A summary of the results of the various investigators, as well as my own experience, brings forth the following conclusions.

1. That the method is practised according to technic of Gauss in fully 90 per cent. of the cases. The results were uniformly favorable to both mother and child. Complications and untoward effects took place in those cases only in which the dosage, as directed by Gauss, was not strictly adhered to.

2. The standard (stable) preparation of scopolamine was, at first, used but little. Open market preparations of hyoscine were employed, and this, in all probability, accounts for a great number of patients who suffered from marked restlessness. With the introduction of the stable (Straub) preparation of scopolamine, this factor has been greatly diminished.

3. Morphine, or narcophin,was not repeated except in extreme cases of restlessness.

4. Nearly all agree that the treatment should not be instituted until there are definite signs of active labor.

5. It is interesting to note that fully 90 per cent. of the patients were treated in a special room assigned for this purpose.

6. Seventy-five to eighty per cent. of all cases treated were primiparæ. The average duration of treatment in primiparæ was seven hours, in multiparæ four hours. The average number of injections in primiparæ was five and one-half, in multiparæ three.

7. In about 60 per cent. of cases the first stage was apparently shortened. All are unanimously agreed that the second stage is definitely prolonged. The third stage does not seem to be influenced.

8. Ten per cent. of the cases showed various degrees of restlessness requiring restraint.

9. Four cases showed signs of active delirium during the postpartum period, but all recovered in a comparatively short time.

10. Treatment was discontinued in 4 per cent. of cases for the following reasons:

a. Too early administration of the drugs; *b.* disproportion between fetal head and pelvis; *c.* cessation of labor pains; *d.* marked alterations in the fetal heart sounds; *e.* repeated injections without any apparent effect.

11. There was no maternal mortality which could possibly be ascribed to this treatment.

12. Labor was terminated in primiparæ by the use of forceps in 26 per cent. of the cases. However, fully 80 per cent. of these were low forceps which merely required lifting the head over the perineum.

13. A general anesthetic was used during the stage of expulsion; and in most instances, chloroform was the anesthetic of choice. Ethyl chloride, ether and somnoform were also used.

14. Seventy-eight per cent. of babies cried spontaneously; 16 per cent. were born oligopneic and required active resuscitation; 3 per cent. were born asphyxiated; 3 per cent. were stillborn; 12 of these or 1.2 per cent. may be accounted for by well-recognized pathological findings, such as transposition of viscera, (two cases); monstrosities (two cases); macerated fetus, cerebral hemorrhage (autopsy), etc.

Of the remaining eighteen cases or 1.8 per cent. we are aware of a number of instances in which large doses of either scopolamine or morphine, or both were given.

15. The treatment is contraindicated in *a.* primary inertia; *b.* labor associated with hemorrhage; *c.* feeble fetal heart sounds; *d*, multiparæ giving history of short labors.

"Twilight Sleep" has its greatest usefulness in primiparæ, particularly during the first stage of labor where the dilation is progressing slowly.

16. It is the consensus of opinion that amnesia, with varying degrees of analgesia, should be our aim. However, the majority consider that the successful termination of a case depends, primarily, upon the degree of amnesia induced.

17. Most investigators are of the opinion that "Twilight Sleep," in properly selected cases, will become a permanent addition to our obstetric armamentarium. We must, however, realize that the great enthusiasm which was created by the introduction of this treatment may in a measure account for the high percentage of successes. In addition to this, we must bear in mind that this treatment was carried out by men best fitted for this work under the most favorable hospital surroundings, and it is but natural to expect results that under ordinary circumstances could not have been obtained. What

the results would be, if this treatment were administered in the average home by men not especially trained in the practice of obstetrics, may be judged by the isolated reports coming from such sources.

It is, therefore, my belief that it would be unwise to adopt this form of treatment to be universal, because the greatest number of women are still confined at their homes, either by midwives or physicians who have not the time nor the training to practise such a delicate therapeutic measure. However, this should not detract from its value. An analysis of the various reports shows that most investigators are fully agreed that "Twilight Sleep" is devoid of any danger to the mother, and that by constant and careful watching, the dangers to the baby are also eliminated.

Judging from my personal experience extending over a period of fifteen months, and covering a series of over 350 cases, I feel that the value of this treatment, and its acceptance as a recognized therapeutic measure, will depend upon out interpretation of the physiological phenomena produced by these drugs. If we accept the theory that the semiconsciousness, induced by the Gaus's method, prevents the actual perception of pain, although apparently present in all its clinical phases, then labor must be considered painless. Therefore, to refuse to adopt this treatment would be a failure on our part to abide by the trust reposed within us. On the other hand, if the mental state induced does not actually prevent the sensation of pain and the patient is actually suffering, even though pain be modified, then the value of this method will devolve upon the degree of diminution of pain or analgesia, and not upon the want of recollection of pain or amnesia.

Personally, I find it difficult to reconcile the fact that a patient, displaying all clinical evidences of pain, such as crying and groaning, does not actually experience it. However, I am fully convinced that pain, in many cases, is not well tolerated and that this would warrant the adoption of this method in selected cases; more especially in primiparæ of the highly emotional type, and in multiparæ in whom we anticipate a long and tedious labor.

DISCUSSION.

Dr. Henry Schwarz, St. Louis, Missouri.—Before speaking on the points that the essayist wanted to limit the discussion to, I would like to say that when we took the work up last January we first tried to determine by animal experiments what the special dangers might be in both the use of scopolamin and the opium alkaloids. One of my associates and my son, Dr. Otto Schwarz,

worked in the pharmacological department on dogs, and particularly dogs whose respiratory center they were able to control. It was shown then that the ordinary doses of scopolamin, such as are considered in twilight sleep, have no appreciable effect on respiration or on blood pressure. If the doses are pushed beyond that measure we get complete dilatation of the pupils, but otherwise we find no ill effects from the scopolamin. The opium alkaloids affected respiration in two ways. Our pharmacologist has shown that the opium alkaloids act directly on the muscles of the bronchioles, causing them to contract, causing bronchial constriction, and in that way interfering with the volume of air that passes to and from the lungs, and the other effect was on the respiratory centers, causing them to become partially or totally inadequate. We seemed to find that this effect was less marked under narcophin than it was under morphin. It is for that reason we used narcophin exclusively, but it is for that reason likewise we never repeated the dose of narcophin.

Furthermore, I want to say that in carefully studying the first publication of Gauss in 1906, I find he really brought out all these points to a nicety. Gauss has shown that the blue babies of which he complains were due altogether to the use of morphin. He then tried a series with opium alkaloids alone and got an increased number of blue babies. He tried a series with scopolamin alone in larger doses and got no blue babies, but got a few excited mothers, and for that reason he insisted on small initial doses of morphin.

Now, as regards the points brought out by the essayist, I will say that I fully agree with him in this, that scopolamin-morphin or narcophin anesthesia is a good addition to our obstetrical means of allaying suffering to child-bearing women. Anyone that knows the suffering associated with prolonged labor in some of the primiparæ, knows that we all, at different times, have tried certain means to allay these pains. We have used chloral hydrate, and we have used morphin injections, but we had to be sparing with the morphin injections on account of its antagonistic action to the labor pains. Since we have been using the pituitary preparations, that contraindication has disappeared, but on account of the fetal respiration, or on account of the difficulty of establishing fetal respiration after the larger doses of the opium alkaloids, we have to restrict the use of opiates in the parturient women. In selected cases, that is, in cases where labor is long enough to give scopolamin a fair play, Gauss calls attention to the fact that you must not force the method, but sneak in with small doses, repeated at reasonable intervals. It is a safe means if the ordinary precautions are observed. We have used it now since January, and we are using it right along in cases that are suitable. We have not had a large number of cases, perhaps seventy-five or eighty every week, and we have no reason for not using it in private practice. There is no reason why in a private home, with a trained assistant, and a good nurse skilled in the method, this means cannot be employed in a selected case as well as in a special room in a hospital.

The academic question which Dr. Rongy raised as to whether women seem to suffer pain or do not remember it, does not seem to me so vital. It is not the aim of this seminarcosis to have women not suffer, but it is to reduce the suffering. In an ideal case the woman continues to suffer, she is able to bear pain in order to assist nature. She must control the pain, as Dr. Rongy has pointed out, but she does not moan when the pain starts; she moans at the height of the contraction. The suffering is greatly reduced and she has no recollection that she has suffered. The fact that they do not remember it, and that they have no ill after-effects, would certainly seem to accelerate their recovery. In a good many cases we have observed after seminarcosis with scopolamin and narcophin, we have noted they made a quicker recovery; that is to say, the shock of a prolonged labor is greatly diminished, if not altogether avoided.

I agree with Dr. Rongy that it would be unfortunate to place this method in general use or have it abused. I agree with him also that we should be permitted to use it in our hospitals or in private practice as we use spinal anesthesia or any other well-established method, and I do believe that we ought to be given a little more time; that we ought not to be forced to come to conclusions and declare ourselves as to whether we are for or against the method. I find a great deal of good in the method, am using it, and shall continue to use it until, like other things, it is displaced by something better.

Dr. Magnus A. Tate, Cincinnati, Ohio.—I do not feel that a subject of this nature before such an association should go by without some discussion by a number of the members present.

About a year ago I presented a paper before the Cincinnati Academy of Medicine on the so-called Twilight Sleep, at which time I presented my findings in nine cases. Since then I have tried it in four additional cases in private practice. In one of these the child died. Whether our technic was wrong or not is a question, but since that time I have not used it, and until better reports are given us I shall discontinue its use, and go back to taking care of our patients the way we did before when we had universally good results.

Some two years ago I collected the statistics of the Cincinnati Hospital obstetrical service for a period of twenty years, and during that time we had between 5000 and 6000 cases, and we use forceps in a little over 2 per cent. The morbidity was the equal, and our mortality was as low as any reports that I have been able to find in hospitals throughout the world, and I had occasion to look over very carefully these extensive reports.

Most of our modern text-book authors tell us that forceps should be used or are used in from 10 to 20 per cent. of the cases. If this so-called Twilight Sleep method is a good form of treatment, as Dr. Rongy says from his gathered reports (he sent out queries to be answered by physicians, and I got one of them and answered it), then undoubtedly there is merit in it in suitable or carefully selected cases in skilled hands. These queries were sent out to men who are doing obstetrics and gynecology as specialists—in fact, to the best

men in the United States. The reports state that in 26 per cent. of the cases forceps were used. Even as is stated, the forceps were used many times simply to lift out the head over the perineum. This to my mind would be one serious objection against this method. Why were forceps used so often? Simply because, the men who were using this method were afraid that if they did not deliver the child in a certain time the child would be dead.

Dr. Orange G. Pfaff, Indianapolis, Indiana.—I would like to ask the doctor how he accounts for even small percentage of mortality in infants? Could any of that be attributed to the use of the drug?

Dr. Gordon K. Dickinson, Jersey City, New Jersey.—I am what you may call an outsider in obstetrics, consequently to me it is a matter of psychology. I have yet to see an enthusiastic article written on twilight sleep that did not come from a German. I have yet to see a large series of cases reported by an American. Most of the Americans, French, and people of that type, the so-called long heads, have had a dozen or two cases treated by this method and then they have stopped; and the roundheads, the Germans, who can study a diatom all their life, one might say, will put anything into twilight sleep.

Dr. John Norval Bell, Detroit, Michigan.—I have not very much to say on this subject, although I have had experience with fifteen cases. Of that number, I have seen one woman go into the most beautiful, quiet, semiunconscious sleep, have her baby without the use of forceps, and when she awoke afterward all that she remembered was that she had two pricks of the hypodermic needle. I have had in that same series of cases a woman who had identically the same treatment, who got and up and struck the nurse and walked around the room, we finding it difficult to control her. Now, I do not think it is as much a question of psychology as it is a question of the patient on whom you are using these drugs. Each of these women has some peculiarity, some peculiar resistance to the drug, and we cannot tell beforehand just how it is going to work. Other than that, my findings correspond exactly, in the small number of cases I have had, with those of Dr. Rongy.

Dr. Adam P. Leighton, Portland, Maine.—My series of cases have been small. Thanks to the kindness of Dr. Rongy, I had the opportunity in New York of seeing and learning his technic. After I returned home I made use of it in a number of cases, and I can say truthfully that I obtained excellent results and there were no subsequent fetal nor maternal abnormalities. The mothers have all said that they would have their next baby in the same way. I used forceps more frequently in these cases than I do or would in a similar number of cases without scopolamin anesthesia.

Dr. Hall.—Why did you use forceps?

Dr. Leighton.—Because the second stage was seemingly prolonged.

Dr. Asa B. Davis, New York City.—I do not feel that I am competent to speak on this subject inasmuch as the experiments

in regard to the use of these drugs in labor have been carried on in the Lying-In Hospital, New York, chiefly by Dr. Harrar and by Dr. McPherson, who presented their findings at the last meeting of this Association. I have been off duty during that time, partly from illness, and I have not seen very much of their actual work. What I have seen has not impressed me favorably. I know, however, that the object it was desired to obtain, has not been reached, and I believe they have decided on a recession in the use of these drugs. That there is some good in the method there can be no doubt, and in careful hands it is one agent we can use, as we can other drugs in suitably selected cases, but I believe like pituitrin, which has been used freely and with dangerous results, it should be mixed very thoroughly with brains.

I deplore very greatly the exploitation of this method that has taken place in the lay press. I think it is very unfortunate, in that it has placed the medical profession in a very disagreeable undignified and uncalled for position, and to my mind the propaganda that has been carried forward resembles too much that of the Friedman treatment.

Dr. J. Henry Carstens, Detroit, Michigan.—Having been originally an obstetrician, the question to my mind is simply this: What is obstetrics? What is a delivery? It is a physiological process. If it is a physiological process and the woman is normal, do we need to use forceps, or do we need to use scopolamin or any other drug? Is it, all things considered, the best thing to allow the physiological process to go on as nature intended it should? Does not the same thing apply to defecation? If defecation is a normal process, why do you need to short-circuit the bowel or resect the transverse colon? When you have an ordinary normal physiological process, and a normal physiological patient, a man or woman, my advice is to let nature alone. There is too much meddlesome interference in many of these cases. If you have an abnormal woman to deal with who has a rigid cervix that will not dilate, or one that dilates very slowly, in former times I used atropin with good results, the same that you would obtain with the use of scopolamin or any other drug. That agent will act on the circular muscular fibers. And so in certain selected cases that treatment is good, but I do not think it is proper to let the statement go out among the general practitioners of the country that scopolamin-morphin anesthesia can be used indiscriminately. It should be pointed out that it is a dangerous method to use under all circumstances. In carefully selected cases those drugs can be used to great advantage. The methods, however, should be used in the hospital and under the supervision of experienced men.

Dr. Arthur H. Bill, Cleveland, Ohio.—I was very much pleased with the safe and sound exposition of this subject given by the essayist, as well as by Dr. Schwarz. I think that the position taken by Dr. Schwarz is extremely scientific, conservative and fair-minded. As repulsive as the agitation for twilight sleep has been to me, and I presume to all of us, the ultimate result may be good. It has

stimulated activity along a line that has been too much neglected. Personally, I have no sympathy with the view that childbirth is such a physiological process that we should sit by and allow nature to take her course regardless of the condition or suffering of the patient. It is our duty to relieve the suffering of the patient as much as possible. I have made it a practice in my work to do everything I could to relieve the pains of childbirth. My position is this: I give a patient something to relieve pain practically the minute she wants it, no matter what the stage of labor is, but what is given depends upon a great many different conditions. A general anesthetic may be given, and this may be ether or nitrous oxide. In other cases, earlier in labor scopolamin and morphin may be given. At any rate, something is given to relieve the suffering of the patient when she wants it; and with the further development of the technic of anesthesia during labor it should be possible to greatly relieve the sufferings of childbirth.

As far as the use of scopolamin-morphin is concerned, I cannot give you an accurate statement as to the number of cases in which I have used it, but the number is over 200. My position may be summed up somewhat as follows: I believe that scopolamin and morphin, one or both, are contraindicated in the second stage of labor. I never give them in the second stage, and I try not to give them in the latter part of the first stage. In other words, I would not like to give either within three hours of the birth of the child.

Dr. Rongy reports a certain fetal mortality, 1.8 per cent. in cases not accounted for by other complications, which could be causes of the death of the child. It occurs to me that these deaths may have been due to too prolonged use of these drugs, that is, too many repetitions of them, so that they are continued even in the second stage. In most multiparæ a general anesthetic is sufficient. My experience is that comparatively few multiparæ need more than a general anesthetic because labor is comparatively short, and from the time the pains are severe enough to make the patient desire to be relieved of them, it is possible to start and continue the use of a general anesthetic throughout the rest of the labor. In a good many primiparæ the period of suffering of the patient is considerably longer than we wish to cover by the use of a general anesthetic. In these cases we do not like to sit by and do nothing for the relief of the patient. In many of the patients I am sure it is possible to use scopolamin and morphin with considerable benefit to the patient. I have used it as a preliminary to the general anesthetic which is continued throughout the rest of the labor. In the cases in which I have used it in this way, stopping before the time when it is usually stopped, and continuing a general anesthetic, I have not had bad results. I have never had bad results from the standpoint of the mother, even when the injections have been given in the second stage, but it has been necessary to resuscitate some of the babies.

There are certain disagreeable factors connected with scopolamin-morphin anesthesia, for example, certain patients are delirious and

almost unmanageable, but if we try to relieve patients by anesthetics, we are bound to meet with some difficulties, which, however, may be overcome.

There is one thing that has not been mentioned, and that is, the use of these drugs in cases of premature birth. If we are handling a case of premature birth, we ought not to use scopolamin-morphin anesthesia for the effect upon the respiratory center is more marked and the babies cannot be resuscitated in some cases.

As far as the use of forceps is concerned, objection has been made to the fact that forceps delivery was necessary in 26 to 28 per cent. of the cases. Personally I do not believe that this is a serious objection to the use of anesthetics during labor. If forceps are skillfully used, low forceps particularly, that is, simply lifting the head over the perineum, as mentioned by Dr. Rongy, there can be no objection on the ground that either the mother or babe are exposed to extra danger. Personally, I do not hesitate to terminate that part of labor, the difficult part of labor, when the head is being pushed over the perineum. It is not always done to save the life of the child; it may be in the interest of the mother as well. I cannot say from my own experience that any complications or any worse results follow from the use of low forceps than when the patient delivers the child.

Dr. Henry S. Lott, Winston, North Carolina.—For twenty years I did my share of obstetric practice. I love this branch of the work, and I watch my patients closely. The general practitioner is looking for authoritative reports, and my feeling toward this feature of our work is this: The general practitioner, who without careful consideration and weighing all sides of the subject, goes into a home loaded with pituitrin, and twilight sleep, is a dangerous man. He is far more dangerous in that home than would be a Zeppelin bomb.

Dr. E. Gustave Zinke, Cincinnati, Ohio.—I began the practice of obstetrics when men still talked loudly and long against the giving of an anesthetic in any kind of labor. I have heard men express holy horror forthose who were guilty of this practice and of exposing women for the purpose of introducing a catheter. But that time has passed. It is our duty to relieve human suffering, but it must be done with good judgment and care. I am a firm believer in relieving labor pains, if necessary. We should never meddle with labor cases. The woman who bears-up well when giving birth to a child and who continues to progress favorably, will require little or no help. There is no reason for giving an anesthetic under such circumstances. Let us be careful. Let us not contribute in the least to making cowards of our women. (Applause.) We are born and put into this world for a distinct purpose. We must teach the young that it is to the honor of both men and women to do their duty at all times and under all conditions. And withal we should assist each other and relieve suffering.

My experience with the practice of obstetrics extends over forty years. The last few years I have seen labor cases only in consulta-

tion. In most of the cases that have come into my care I got along beautifully with the occasional administration of a hypodermic of morphin, sometimes I used chloral hydrate alone, now and then combined with the former. In most cases chloroform was given just enough to obtund the pain near the end of the second stage of labor. In rare instances, when necessary, all these drugs were used and chloroform, or ether, given to complete unconsciousness. Like many of us, I have had numerous cases where women, who had been previously attended by a midwife, or a physician, claimed never to have had such good care and such an "easy time" as I had given them, and that they did not want anybody else but me thereafter. There is, perhaps not one among us who has not had the same experience.

When the article on "Twilight Sleep" or "Painless Labor" appeared in one of our popular monthlies, there were many in the medical profession of this country who felt that a serious wrong had been committed. Now, I am distinctly pro-German, and would not, at this time, abuse a German, or anything German, under any circumstances even if justified. (Laughter.) But, as we are talking *inter nous*, I am free to state that the originators of twilight sleep covered themselves with no glory by publishing their experience with scopolamin-morphin in the manner they did. It was this that gave offense not only in these United States, but anywhere where that particular publication was read. It was nothing but prostituting the art and science of midwifery to mercenary purposes. It was a bid for pregnant American women to go to Freiburg to be delivered "*painlessly*," and to have "*healthier and handsomer babies*" on account of it.

The fact remains: All women continue to suffer, more or less, under the "twilight" treatment; but, as in all other instances, the suffering is soon forgotten. I want to be reasonable. I think Dr. Schwarz and Dr. Rongy presented the subject very clearly. Let the remedy be tested thoroughly to see whether there is anything in it worthy to be kept. If the method proves to be better than the simple use of chloroform or ether, with or without chloral or morphin, let the method be adopted. But do not lead women to believe they can be delivered without the least pain. No obstetrician, who is an obstetrician, believes that this can be done without complete anesthesia.

Dr. Rongy (closing).—I wish in the first place to thank the members of the association for their very interesting and instructive discussion of my paper.

With reference to oligopnea, the point raised by Dr. Schwarz, I believe that the asphyxia is not induced by morphin but by scopolamin. In our cases morphin or narcophin was used only once as an initial injection and was but seldom repeated, yet the percentage of oligopneic babies born was as high as 17 per cent. The period of time between the first injection and the delivery was in most instances sufficiently long to exclude any possible effects of morphin. The dilated pupils observed in these babies further

emphasizes the fact that they are under the influence of scopolamin rather than morphin.

As to the increased use of forceps, mentioned by Dr. Tate; this is due entirely to the fact that the second stage of labor is very often unduly prolonged. The head reaches the perineum and the expulsive power is not sufficiently strong to bring about the birth of the child. In the majority of cases the forceps is used for the purpose of lifting the head over the perineum.

As to the infant mortality, mentioned by Dr. Pfaff, I wish to state that in this series of 2000 cases the infant mortality is somewhat higher, when we take into consideration that this treatment was administered to patients at or about term with the viability of the child thoroughly investigated. These patients in most instances were attended by competent obstetricians. Notwithstanding all this we find an infant mortality of 3 per cent. which I think is higher than it should be. There are eighteen stillbirths reported that are not accounted for pathologically but we know of three or four cases in which morphin was repeated three times and the dose of scopolamin given was entirely too large. I believe the danger of the babies may be greatly lessened if we strictly adhere to the technic outlined by Gauss.

As for restlessness which was observed in a number of cases I feel that this condition will always obtain in a small per cent. of cases. The highly emotional type of woman who cannot bear pain, and who in a measure is subject to suggestion will necessarily be influenced by scopolamin-morphin anesthesia much more readily than the woman who is less sensitive and more stoically constructed. There is certainly a class of women who must be relieved of some pain during labor.

It seems to me, that the sooner we are able to explain that the so-called "Twilight Sleep" is not a painless labor but that it is a method by which a certain amount of pain may be reduced, the better it will be for the women and it will also help to bring forth the true merit of this method of treatment so that it may be properly placed as an addition to our obstetric armamentarium. I am convinced from personal experience and from the various reports received that scopolamin-morphin anesthesia will not and cannot be universally adopted, yet it will be used in certain numbers of selected cases by properly trained men and with proper hospital surroundings.

To generally advocate this treatment would prove disastrous to both mother and child.

AN UNUSUAL CASE OF MYOFIBROMA, COMPLICATING PREGNANCY.

BY

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(With one illustration.)

Mrs. S., aged thirty-one, married four years. Six months after marriage aborted when pregnant three months. I saw her in consultation the latter part of January of this year; found her six and one-half months pregnant, suffering from severe abdominal pain for about two weeks, the last week of which she had been confined to bed and required opiates to relieve the pain. Her temperature varied between normal and 100+° F. Pulse 80 to 86, fairly good volume. There was tenderness on pressure over the entire abdomen, but more marked in the right lower quadrant; no rigidity of the

Fig. 1.—Leio-myofibroma.

abdominal muscles; urine normal. The blood showed a slight leukocytosis characteristic of the latter half of pregnancy. Hoping gestation might be continued until the child was viable, operative treatment was postponed. She was advised to remain in bed and opiates ordered to be given as required. After two days and nights of this treatment the pain became so severe that every breath she took "cut like a knife." The pain was so great that she willingly consented to an exploratory laparotomy.

The abdomen opened a spot, 4 to 5 cm. in diameter and of the appearance of raw beef, was observed upon the anterior surface of the uterus near the right cornua. The growth was even with the uterine surface, eroded, and seemed to penetrate the uterine wall to the endometrium. Adhesions were absent opposite or near the tumor. Enucleation was attended with some difficulty. The

tumor did not have a well-defined capsule as we observe in the ordinary small potato-like uterine fibroids. The hemorrhage was easily controlled and a very satisfactory closure of the opening obtained. There was no apparent shock following the operation; and that evening we were very hopeful that the pregnancy would not be disturbed. During the night, however, labor pains developed and the patient promptly miscarried. Recovery was uneventful.

The pathologist, Dr. Wittwer, who examined the specimen, reports as follows:

"Specimen presented for pathological examination is a tumor, oval in shape, 5.5 cm. long and 3.2 cm. in diameter at its widest point. At the narrowest point was a pedicle by which it had been attached to the uterus. On median section, the outer portion of the tumor appeared pale and very firm; the inner portion of it was soft, boggy and very vascular. The vascularity, apparently, originated from the pedicle; the central portion of mass closely resembled a piece of raw beef. On the upper and outer surface of the tumor was a denuded area which appeared, as though having been adherent to some other structure; the microscope, however, showed nothing more than a mild inflammatory reaction. Pathologic diagnosis; hyaline leio-myofibroma. No evidence of malignancy."

The intensity of the pain was the most prominent symptom in the clinical history of the case. At first I was inclined to regard the symptoms as not serious; but the limited excursions of the diaphragm, the great suffering the patient endured when attempting to change posture in bed, finally determined me to adopt radical measures for her relief, in spite of the fact that she was anxious to become a mother.

The accompanying cut illustrates the bisected specimen.

DISCUSSION.

Dr. Francis Reder, St. Louis, Missouri.—This is an unusual case. A tumor may give its clinical evidence at the beginning of impregnation. The rapid growth, of both tumor and uterus, adds greatly to the patient's discomfort, and the frequent occurrence of paroxysmal pains denotes the tendency to abortion. Under the circumstances the doctor is not to be criticised for pursuing the course he did. Entertaining the most conservative views of the management of fibroids a myomectomy in a pregnant subject is considered by many an unjustifiable procedure. This case terminated very happily. Should an abortion follow a recent myomectomy there is not only the danger of hemorrhage, but the great danger of the giving way of sutures, causing serious consequences.

Dr. Abraham J. Rongy, New York City.—Pain associated with a tumor or tumors of the pregnant uterus will depend upon the location of the tumor. If the tumor is a myoma and a large one which is likely to interfere with labor, then it should be removed, but there

are many women who have fibroid tumors of the uterus without pain and have given birth to two or three children. If the myoma is situated near the submucosa it may be very painful. I recall one experience with a woman who had a tumor of the uterus. I suggested its removal, but she refused. This tumor became very painful, and she finally returned to have an operation performed. I examined her casually, knowing she had a tumor, but did not go definitely into the history. At the operation in removing the tumor I came across a pregnant sac. I sewed over the sac, separated the tumor from the uterus, and sutured the incised wound in the uterus. I think it is a better plan to suture with silk than with catgut on account of the point raised by Dr. Reder, that in case of abortion or infection the catgut ligatures may rupture and cause trouble. That woman went into labor, which was quite tedious, and gave birth to a stillborn child.

The question of myomas of the uterus associated with pregnancy is an important one. As long as the woman is well and there are no symptoms manifested from the existence of the tumor, the case should be let alone. Very often, however, a number of these women get excruciating pain on account of slight contractions which take place in the muscular coat of the uterus, pressing on the nerve filaments, and in such a case one is justified in removing the tumor.

Dr. Asa B. Davis, New York City.—I have seen quite a number of cases of fibroid tumors complicating pregnancy. At our meeting held in Providence, Rhode Island, last year, I reported one of these cases where a fibroid tumor caused considerable pain, which was located in the posterior wall of the uterus, down near the cervix. It was about the fourth month of pregnancy. I removed this tumor successfully, the patient went on to full term, and was delivered without any untoward results.

I have seen five or six cases of fibroid tumor occluding the birth canal to such an extent that Cesarean section was apparently the only method by which these women could be delivered. These cases have all made good recoveries, and I have had no case in which I have found it necessary to remove the tumors. Unless there is some good reason and the tumor is situated so as to cause the patient danger, I believe they are much more comfortable by leaving them alone at the time of delivery. I have treated five or six such cases in that way, and with good results. These women can carry their tumors without any particular harm. One case I have reported in detail before this Association with a good deal of interest. She was a woman who had borne quite a number of children, became pregnant, and in the interval, or during the time the tumor was slowly growing it grew to such an extent that it completely blocked the pelvic canal. Cesarean section was done, the cavity of the uterus was on the right side, the child was removed and when this was done the tension was found to be so great on the cavity of the uterus that it gave the sensation of snapping back like a rubber band. I believe a cross-section of that tumor would give us a concentric cavity. That

patient was well for a while, and two years ago she had a bleeding, was having labor pains, and was within six weeks of term. She was an intelligent woman. This was the second time I expected to do a Cesarean section, and she was perfectly willing to remain in bed. She was kept in bed about five weeks, and when uterine contraction came on she had a small dose of codein, and when she was well we allowed her to get up. There was no examination made because we knew what the condition was, and I did not want to interfere with her in any way. One day, at the noon hour, when the membranes ruptured while she was walking about, she was hardly able to get around the table before she had a precipitate delivery. What happened there I believe was that in the course of her rest in bed the tumor, which was very large, had decreased in size, or the edema which might have been a large part of the tumor, had subsided and left room enough for the child to be delivered.

Dr. Abraham J. Rongy, New York City.—I fully endorse the statement made by Dr. Davis that when we are engaged in performing a Cesarean section we should do as little as possible. There is great danger in handling the intraperitoneal cavity, particularly in doing a hysterectomy following a Cesarean section.

During the past three months I have performed a Cesarean section for a fibroid tumor obstructing the lower pelvic canal. I removed the baby and left the tumor in. There are a number of fibroid tumors which occupy the lower segment of the uterus and a part of the cervix. In these cases it is impossible to remove them by supravaginal hysterectomy; it is necessary to do a complete hysterectomy which of course endangers the life of the woman. On the other hand, if the woman goes into labor the fibroid tumor of the uterus has to be watched carefully, for spontaneous rupture of the uterus may take place. I know of one patient who had two fibroids, one on the right side and one on the fundus, labor progressed normally without obstruction, but suddenly the uterus ruptured, the woman went into collapse, and we had to operate in a hurry. In a general way, I would say leave the fibroids alone while engaged in doing a Cesarean section, and the results will be very much better.

Dr. Francis Reder, St. Louis, Missouri.—The case that the essayist cited in which he succeeded in removing a tumor and not interrupting pregnancy is exceedingly interesting. Such an operative measure rests with the judgment of the operator. The size of the tumor and the time of pregnancy are important factors. If the tumor is discovered before the placenta becomes a separate organ, during the third month, it can usually be removed. There is great danger, of hemorrhage in removing these cervical tumors.

In the second case the doctor cited the surgeon had recourse to abortive measures. This is a very serious procedure, as an abortion under such conditions carries with itself a high rate of mortality, three times greater than abortion caused by the mechanical action of the tumor. The procedure that Dr. Rongy has outlined here is probably the only one for the safety of the woman.

ATYPICAL CHORIOEPITHELIOMA.

BY

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SÄNGER in 1888 was probably the first to recognize and to call attention to a tumor which was related to pregnancy and which differed essentially from any other known tumor.

Adami says that in the years immediately following the publication of Sänger's description of this tumor there was an angry discussion among leading pathologists as to the origin of the same. Some contended that they were decidual and, therefore, of maternal origin; while others claimed they were chorionic and, therefore, of fetal, epiblastic origin.

It probably was Marchand's investigations and deductions that helped most in establishing the fact that these tumors originated in the chorionic epithelium and are best classified as (1) typical, (2) atypical and (3) transitional chorioepitheliomata.

(1) The typical chorioepitheliomata are composed of varying proportions of large multinucleated, eosinophil, syncytial masses and a smaller proportion of mononuclear, polyhedral, lightly stainable Langhans' cells. No great importance is attached to the presence or absence of villi, or to the varying degrees of metaplasia of these cells.

(2) The atypical chorioepitheliomata are described as an infiltration of the uterine musculature with large acidophil, mononuclear cells which Marchand and others have shown to be derived from the fetal ectodermal cells. The function of these cells, their resemblance to the syncytium, as well as their association with more definite syncytial masses in the infiltrated muscle, led to their designation as syncytial wandering cells.

(3) Marchand also described transitional tumors in which there is an increasing proportion of the syncytium and wandering cells and a decrease, or absence, of Langhans' cells as compared with the typical tumors.

Ewing, after most painstaking research, has amplified this classification by subdividing the typical into (*a*) chorioadenoma destruens (the so-called malignant placental polyp) and (*b*) chorio-

carcinoma. In this group the tumor cell exhibits a remarkable capacity for growth apart from villi, showing also advanced metaplasia, and in metastasizing it shows a remarkable loss of differentiation, grows diffusely and fails to show the orderly arrangement or polarity of the milder forms.

Ewing also suggests a twofold division of the atypical group into (*a*) the least malignant class to be called syncytical endometritis, and into (*b*) a transitional class to be called syncytioma or syncytial chorioma. It is in the atypical group that we find so many cases which recover either spontaneously or after partial removal of the tumor.

Ewing claims in favor of syncytioma or synctial chorioma, that it is easy in them to account for the varying degrees of progression and regression. His argument is exceedingly interesting and is based on the fact that there is a definite relationship between the histological structure and the clinical history of these tumors, and that in this way only can a definite potential malignancy for each group be established. Therefore, both prognosis and treatment depend in large measure upon the accuracy of our knowledge of these facts.

The case herewith reported is classified as an atypical chorioepithelioma. Mrs. F., a patient of Dr. O. (to whom I am indebted for the case report up to the time of her admission to the hospital) aet. twenty-five; multipara; three children; ages two, five and seven respectively; family history good. Prior to 1912, general health was excellent. At this time she miscarried at the seventh month. Ill health followed. The principal complaint was general weakness and an unaccountable, persistently recurring, anemia. The latter was so pronounced that menstruation was very scant and the menstruum very pale. February, 1914, menstruation ceased. June 13, miscarried at three months. The attending physician thought that the uterus had completely emptied itself. June 14, a severe chill followed by high fever and profuse perspiration. July 5, the lochia became both profuse and offensive, whereupon Dr. O. did a careful curettement. The scrapings were not examined microscopically. All symptoms improved for a few days, only to recur with greater violence.

July 19, patient was admitted to the hospital and placed in the writer's care. She was *extremely* weak; had an anxious expression; waxy pallor of the face and skin; filiform pulse; well-marked air-hunger; hemoglobin less than 40 per cent. The persistent uterine hemorrhage was extremely pale in color and offensive in odor. Uterus large; cervix patulous, revealing a soft spongy mass in cavity of uterus. This spongy mass, after removal, had the gross appearance of an old blood clot undergoing putrefaction. However, when this was carefully examined under the microscope there were very many large mononuclear cells found, which the pathologist, Dr. R. H. Grube, pronounced

typical, wandering, syncytial cells. The uterus was carefully packed with iodoform gauze and hemotonics prescribed. The patient's condition improved slowly until August 1, when she was seized with sharp pain in left thorax external to the base of the heart. This was accompanied by hard paroxysms of coughing to be soon followed by free, bloody, offensive expectoration. Specimens of the sputum were repeatedly examined by Dr. Grube, and always found to contain large mononuclear cells identical with the ones found in the bloody mass removed from the uterus. At this time the liver and spleen were found to be greatly enlarged and thereupon an unfavorable prognosis was given. But, all expectations to the contrary, there was an immediate improvement in the patient's condition. The septic condition disappeared and general health greatly improved. Hemoglobin soon reached 80. September 20, 1914, the patient was discharged from the hospital. At this writing her health seems completely restored. A physical examination made September 8, 1915, shows absolutely no sign of disease in the pelvis or in the lungs.

In addition to the case detailed above, as an example of atypical chorioepithelioma, and, probably, belonging to the subdivision described by Ewing as syncytial endometritis. I am quite sure, that at least two similar cases have come under my observation in past years of which I have no clear record, except the simple statement of the pathologist, at the time of the operation, that the specimens were pure types of chorioepithelioma; and, the further interesting fact, that both of these cases followed pregnancies occurring during a period of ill health in which anemia was a prominent symptom.

I cannot but conclude that the lowered vitality and impoverished blood constituents were contributing factors in the etiology of these tumors. And, furthermore, I am convinced that this disease is far more common than is at present recognized. This is, no doubt, largely due to the fact that most operators, like myself, have been too indifferent as to the value of laboratory examination of specimens obtained at the time of operation. In substantiation of the former statement as to the etiology of this disease, I ask your indulgence to a few pithy quotations from one of our most careful observers, touching upon this and other points connected with this brief report:

Dr. George Schmauck, in a most interesting paper read before the Chicago Gynecological Society, February, 1906, says: "I regard this peculiar growth as a consequence of pregnancy and attribute the proliferative tendency of its cells to a deficiency of the resistance of the maternal organism and not the emancipation of the chorionic epithelium." "Spontaneous recovery from incompletely operated cases can only be explained by the assumption of maternal protective

powers." "Contrary to the still very speculative spontaneous recovery in carcinoma, one may frankly state that it is the woman's nature, not the surgeon's knife, which cures chorioepithelioma." "Operative intervention does not cure the woman of the growth, the constituents of which have probably permeated the whole parametrium and have settled in other organs. We only relieve her from the weakening hemorrhage and discharge, and facilitate thereby her spontaneous recovery." "The most significant point in the clinical diagnosis is the discrimination between a localized process and a generalized chorioepithelioma. The localized growth developed within the placental area is relatively harmless. It remains local because (and as long as) the maternal organism masters the dissemination."

Again, Schmauck calls attention to the fact that "Schmorl's research has proven that embolism of placentary cells occurs at all periods of pregnancy, and that these deported cells may even proliferate in the invaded pulmonary vessels." Therefore, "pulmonary symptoms should not be valued too highly. In a disease which chiefly takes place inside of blood-vessels an occasional pulmonary infarct cannot astonish us." Again he says: "Chorioepithelial elements, so far as I know, have never been detected in the sputum." The pathologist in the case herewith reported is very positive to have found them.

Stahl, in discussing Schmauck's paper says: "It may be these chorioepithelioma are benignant up to a certain point, but when proliferation takes place beyond a certain point then they with their metastases become malignant."

Concluding, Schmauck remarks, "With our present knowledge of chorioepithelioma malignum we shall decide comparatively early to remove the uterus in an older woman when there is an actually destructive growth. But in a young woman only after a serious consideration of all other circumstances."

In presenting this brief paper the writer has hoped to emphasize the necessity of more careful examination of all specimens removed by the curet, and of a more careful preservation of records in all such cases. Second, to express the belief that atypical chorioepithelioma is far more common than is at present recognized. Third, to call attention to the possible influence of impoverished blood conditions as a determining factor in the etiology of this peculiar disease. And finally, to express the hope that prompt medical and surgical intervention, having in mind the conservation of the patient's own curative resources, will be the guiding principle in its treatment.

FIBROID TUMOR COMPLETELY OBSTRUCTING UTERINE CANAL; DEAD FETUS LONG RETAINED WITHOUT INFECTION.

BY

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(With one illustration.)

In connection with the report of a very unusual case of uterine fibroid complicating pregnancy, I wish to call attention to a series of collated cases which present numerous interesting features of a somewhat similar character.

The first is a demonstration by Hartog(1) of a submucous cervical myoma the size of a child's head, weighing 1250 grams, which was enucleated during the placental period. The patient was a woman, thirty-eight years of age, pregnant with her fifth child, who was admitted to the clinic after three days of ineffectual labor pains. Immediate extraction of a dead child per vaginum was performed. Extremely profuse hemorrhage ensued and manual detachment of the supposedly adherent placenta was to have been performed for control of the bleeding, but on introduction of the hand the passage to the uterine cavity was found to be blocked by a tumor as large as a child's head, which was broadly inserted at the upper cervical segment on the right side. It was interpreted as a submucous myoma. The placenta was reached with difficulty, alongside of the tumor, and was extracted as a whole. Although the uterus contracted satisfactorily, the hemorrhage continued and became alarming. It was, therefore, decided to extirpate the myoma and the enucleation was successfully accomplished. As the hemorrhage stopped, no further operation was performed; especially as no perforation could be discovered on careful examination. Patient was given camphor and an infusion of 1000 c.c. salt solution, and her general condition visibly improved. After about one hour the hemorrhage reappeared and could not be controlled by massage. Patient's general condition became rapidly worse and the pulse was temporarily imperceptible. Soon after the uterus had been tamponed as an emergency procedure, the patient died, two hours after delivery.

Rosenstein, in the Breslau Gyn. Society, referred to a case under his observation in which a large cervical myoma was mistaken for an ovarian tumor. Rosenstein performed laparotomy and induced

artificial labor by means of a bougie. The resulting pains had the effect of wedging the myoma into the small pelvis, thereby causing total intestinal obstruction. Seemingly no alternative was left but the vaginal removal of the pregnant uterus together with the tumor. This was successfully accomplished and the patient made a good recovery.

Zangemeister(2) presented a myoma of the parturient uterus obtained by operation. The myoma had attained the size of a large fist and blocked the pelvis of the patient, a primipara thirty years of age. A living child was obtained through Cesarean section. At the operation the uterus appeared to be in imminent danger of rupture and supravaginal amputation was performed, followed by detachment of the myoma. The uterine cavity contained gaseous, purulent, amniotic fluid, colon bacilli and streptococci. An uneventful recovery ensued.

Fuchs(3) performed a Porro operation upon a primipara forty years of age, on account of a myoma acting as an obstacle to delivery. Mother and child were discharged well on the fourteenth day after the operation.

This case of Fuch's presented certain noteworthy features, aside from the rapid growth of the myoma, which *during six months of the pregnancy* reached *about three times its original volume.* The topographical relations of the tumor to the pregnant uterus (the anterior uterine wall being the seat of the tumor) led to an extreme bulging of the posterior uterine wall, still demonstrable in the fifth month. The rising uterus did not drag the myoma along, as had been expected, but by virtue of its subperitoneal location the myoma continued to develop downward into the pelvis where it finally became an irreducible birth obstacle. Spontaneous expulsion with the labor pains failed to occur. The fetus came to lie in a transverse position in consequence of the obstruction at the pelvic inlet. Cesarean section seemed positively indicated. The conservative Cesarean section alone, leaving the tumor behind, would have exposed ther myoma to the danger of necrosis during the puerperium, especially as it extended near the lower birth passage. At any rate, the patient would have had to submit to another laparotomy later. Cesarean section with enucleation of the myoma would have created less favorable conditions of the wound than the procedure which was selected, namely, supravaginal amputation which fulfilled both the obstetrical and the gynecological indications and resulted in recovery.

An interesting report was made by Carmichael(4) of the case of a primipara forty-two years of age; a myoma the size of an apple was removed from the uterine fundus, through a laparotomy incision, in

the fifth month of pregnancy, on account of severe pains. A larger myoma was found to be in the cervix, presumably an insuperable obstacle to spontaneous delivery. This was not disturbed and the pregnancy progressed without interruption, and at term the patient was delivered of living twins, through Cesarean section followed by hysterectomy.

Volmat(5) refers to the case of a primipara, forty-three years of age, who was found to have a large myoma the size of a child's head,

FIG. 1.

solidly wedged in the pelvic inlet; the child lay above it in transverse position. The pregnancy took an uninterrupted course. At the end of the ninth month, in the absence of labor pains, Cesarean section was performed, followed by hysterectomy. Mother and child made good recoveries.

Fothergill(6) describes a case in which the fibroma was applied to the anterior wall of the uterus, very low down, absolutely blocking the pelvic inlet. Mother and child were both saved through Cesarean section.

G. A. Hendon(7) enucleated a fibroid tumor by laparotomy and discovered a four months' pregnancy; the woman aborted in twenty-four hours, but made a good recovery.

Schrenck(8) observed the combination of two subserous myomata, the size of a fist, with normal pregnancy. Delivery at term with forceps. Atonic secondary hemorrhage followed, but good recovery resulted.

The interesting case which I will briefly report is as follows: A colored woman, thirty-five years old, was admitted to the Indianapolis City Hospital, Oct. 7, 1914. Unfortunately a very meager history was obtained and the patient could not be located after leaving the hospital. She was a multipara and had usually enjoyed fair health; there was no history of an acute infection, nor of any inflammatory attacks. She had complained only moderately of pelvic soreness and backache. Examination before operation showed a uterine tumor of good size which presented two large bosses. *Clinical diagnosis*—fibroid tumors of the uterus. Operation, Oct. 13, 1914. Dr. O. G. Pfaff; supravaginal hysterectomy; left tube and ovary not removed.

Gross Description of the Specimen.—The specimen consists of the fundus of the uterus together with the right tube and ovary. It measures about 7 inches in length and presents two tumors. The lower is about 5 inches in diameter, is very elastic and firm. The upper, which is situated somewhat in front of the lower, is about 2 inches in diameter and gives a sensation when palpated like that of parchment. It appeared to be a calcareous structure. On medial longitudinal section, the lower tumor is found to be a large submucous fibroid measuring on an average of 4 inches in diameter and bulging into the cavity of the uterus which is distorted to accommodate it. The small crepitant tumor above is found to be the skull of a partially macerated fetus which is still attached by the umbilical cord to the remnants of its placenta. The skull measures 2 inches in diameter and is covered by a thin coat of uterine muscle. The brain has been reduced to a grumous material resembling thin cottage cheese. No amniotic fluid is present. The ovary and tube are normal. *Diagnosis*—submucous fibroid tumor blocking the outlet of the uterus; macerated fetus. *Microscopic sections* of the tumor were made which show nothing of special interest.

The pregnancy had evidently been interrupted many months previously and indeed the appearance of the fetus suggested that it might have been present in its peculiarly isolated and protected position for a term of years, infection having been obviated by the mechanical occlusion of the greater part of the uterine canal. Uneventful recovery ensued.

My chief thought on this subject is that mechanical obstruction of the birth canal, due to the presence of fibroid tumors, is sufficiently common to merit that degree of appreciation at the hands of the

family doctor which shall lead to a more intelligent activity in efforts to prevent the serious and sometimes disastrous complications which result in such cases when pregnancy occurs. We all concede a general familiarity with the subject but to consider the matter in a purely speculative way is hardly sufficient. The study of specific cases should be of much greater value, and may in turn enable us to present to the medical attendant in a more convincing form the reasons why, even the smaller fibroids, should be sought and removed. One may easily lose sight of the fact that a small tumor frequently undergoes a considerable and sometimes very great enlargement during pregnancy, and that to ignore the presence of these neoplasms is to determine that the individual must in the event of pregnancy assume a grave and unfair hazard and one which she might be readily spared through a timely surgical operation.

BIBLIOGRAPHY.

1. *Monatschrift für Geburtsh und Gynaekol.*, vol. xxix, 1909, p. 431.
2. *Monatschrift für Geburtsh und Gynaekol.*, vol. xxvii, 1908, p. 402.
3. *Monatschrift für Geburtsh und Gynaekol.*, vol. xxxiii, 1911, p. 229.
4. *The Journal of Obstetrics and Gynecology of the British Empire*, vol. xxiv, No. 2, 1913, p. 124.
5. *Bulletin de la Soc. d'Obst. et Gyn. de Paris.*
6. *British Medical Journal*, Nov. 8, 1913, p. 1230.
7. *Am. Journal of Surgery*, vol. xi, 1913, p. 429.
8. *Deutsche Med. Wochenschrift*, vol. xxxi, 1913, p. 1525.

THE TEACHING OF OBSTETRICS.

BY

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TEXT-BOOK titles as "Theory and Practice of Medicine" and "Principles and Practice of Obstetrics," emphasize alike the fact that medicine is both a science and an art. In teaching medicine, however, there is a tendency to minimize the importance of the science and emphasize that of the art. This tendency is both natural and logical for a number of reasons: The teaching of the science is largely in the abstract and has to do with the ideal, with theories, principles and fundamentals; whereas the teaching of the art is almost wholly in the concrete and deals with the application of the science to every-day life in medical matters. Much of the science is abstruse, speculative, of doubtful signification and, in parts, difficult to comprehend in its relationship to the end sought in the study of the subject. The art, on the other hand, has to do with the practical, with things immediately before, and deals largely with that which is possible of accomplishment. The science, while regarded as essential, is all too frequently valued only as a means to an end—to equip for the practice of medicine. As it is the exceptional student only who is fitted by temperament, inclination and equipment for a career in purely scientific medicine, the demand is largely for teaching along practical lines.

The scientist in medicine naturally becomes the teacher and investigator; whereas the artist in medicine, inevitably, becomes the practitioner. It would thus appear that in the teaching of medicine there is a twofold purpose—the training of teachers and investigators, and of practitioners. This is usually the ultimate result; but if such discrimination is unduly emphasized in undergraduate instruction, it will defeat the object of prime importance in all medical teaching, namely, the training of physicians.

The student, whether he is to spend his life in the laboratory, in teaching or in private practice, must apply the same spirit of scientific inquiry to his work from the beginning to the end of his undergraduate studies. He must be led and inspired to seek truth

for its own sake and entirely apart from any consideration as to whether or not it will be of practical value. Building upon such a foundation the physician will be prepared to solve problems for himself in whatever department or field of medicine he may be occupied. Whether as teacher, investigator or practitioner, it makes but little difference. He may even be all three of these with distinguished success; and when he is, he becomes the ideal teacher.

The science and art of medicine may not be separated with advantage in the teaching of the subject. There may, perhaps, be such a thing as a pure scientist in medicine, for no man can practise medicine successfully whose art is not rooted and grounded in the science. Likewise, the teacher and investigator in medicine must know much of the art, and for the teacher of clinical medicine extensive experience in practice is an indispensable qualification.

It is with the above-expressed convictions in regard to medical education in general that I would approach the subject of the teaching of obstetrics. Obstetrics belongs to the so-called clinical branches of medicine and as such, according to prevailing custom, is taught both didactically and clinically. And this brings up at once the relative importance of didactic and clinical teaching in obstetrics. There can be no question but that the more concrete the didactic teaching can be made, and the more intimate its affiliation with the clinical, the more effective will be the teaching and the better, therefore, the results in practice. There are those even who claim that the didactic instruction should be given in conjunction with the clinical and in no other way. At first thought this appears ideal; but the ideal, here as frequently elsewhere in medicine, is impracticable and even impossible of accomplishment. Obstetric cases must be utilized for teaching purposes when available, yet more often than otherwise, they are not available when most needed. From the clinical standpoint, moreover, a case rarely, if ever, covers all phases of the subject so that in order to make the teaching of the subject under consideration complete, didactic teaching must supplement the clinical. Then, too, since only cases available at the time set for the clinic can be used, a systematic and exhaustive course of lectures covering the entire subject of obstetrics cannot be given clinically unless a varied and unlimited amount of clinical material is available and an amount of time given to the course much beyond that usually assigned to obstetrics in the medical curriculum. From the nature of the subject matter, moreover, there is much of obstetrics which cannot be taught clinically. There are, in addition, a number of obstetric events and conditions which, although suitable

for clinical teaching, are so rare and so infrequent in their occurrence that opportunity is seldom given for their observation.

For the reasons given, and for others which might be enumerated, I am of the opinion that didactic teaching in obstetrics cannot be eliminated from the curriculum without great loss to the student. The foundations of obstetrics as a science can be soundly and effectively laid only by a systematic course of didactic instruction in the fundamentals and such other parts of the subject as do not lend themselves to clinical teaching. All didactic instruction, however, should be pictorially or otherwise concretely illustrated and wherever practicable should be emphasized and fixed by laboratory studies and clinical contact through observation, demonstration and practice upon the living subject. If due regard be given to the claims of the other medical subjects in the curriculum, sufficient time cannot be allotted to obstetrics to make possible the training of competent obstetricians by undergraduate instruction alone. On the other hand, undergraduate instruction in obstetrics must be of the kind upon which graduate students not only can but must build while specializing in the subject. In other words, the teaching so far as it goes, must be correct and of the proper spirit. If then obstetrics is to be taught as a science it is inevitable, with the limited time of necessity given to it, that the subject be covered didactically where clinical opportunities are not available and where clinical teaching, from the nature of the subject matter, is not applicable.

As stated, all didactic teaching should be concretely illustrated. This may best be accomplished by the use of models depicting accurately everything in obstetrics possible of reproduction. Such models should include especially the following: the entire subject of embryology as it is known and taught; the obstetric anatomy of the female genitalia and pelvis including all pelvic anomalies; the gross and structural changes which take place in the genitalia, especially the uterus, from the very beginning to the end of pregnancy; the changes which take place in the uterus and lower birth canal during labor; the attitudes, positions and presentations of the fetus in utero-normal and abnormal; the successive attitudes which the fetus assumes in passing through the birth canal in the mechanisms of labor in each and every position of the fetus; the gross and structural changes which take place in the uterus during the third stage of labor; the gross and structural anatomy of the placenta including all anomalies and diseased conditions; the effect of labor upon the baby as the molding of the head, the formation and struc-

ture of the caput and cephalhematoma, intracranial hemorrhages, fractures, birth palsies and all abnormalities, monstrosities and diseases of the new-born; the changes in the genitalia including the breasts, associated with the puerperium; certain accidents, complications and diseases of pregnancy, labor and the puerperium; the various injuries to the birth canal, their effects and cure; and obstetric operations.

As there is in existence, at the present time, no obstetric teaching museum containing models of the scope and character above indicated, there is likewise in existence no obstetric teaching institution properly equipped for the teaching of obstetrics as it should be taught. As a substitute for such museum or as a supplement to such as may exist, there has been devised nothing equal to opaque and lantern slide projection. I am convinced that at the present time no course in obstetrics may be regarded as complete without the use of some sort of efficient projectoscope in both the didactic and clinical teaching. I am also of the opinion that in the not distant future motion pictures will supplant all other means of pictorial illustration in medicine.

I would not overemphasize the importance of didactic teaching in obstetrics. It is basic and indispensable to the teaching of obstetrics as a science. It must in part precede and in part accompany clinical teaching, but can never take its place, as has too long been attempted. In times past obstetrics was taught very largely didactically and in certain quarters this is still the case. Even at the present time in all but a few medical schools in this country, the clinical teaching and practical experience given undergraduate students in obstetrics are woefully deficient. Both the teaching and practice of obstetrics are generally regarded as the poorest of all the clinical branches of medicine. There must be a reason.

It seems to me that, in the final analysis, the explanation will be found in the fact that from the beginnings of human history childbirth has been regarded as a normal process. In spite of much proof to the contrary, the idea is so deeply rooted in the mind of the race that its eradication is a very slow, even though a certain, process. In other words, there does not exist a universal or as yet even a popular demand for good obstetrics; and until there is such it is going to be most difficult to improve the quality of the teaching beyond a certain point. Students of medicine will not make extensive preparation for practice in a field of medicine which offers so little in the way of returns as does obstetrics to-day in general practice. It would thus appear that the standard of obstetric

teaching is low very largely because the standard of obstetric practice is low. The trouble is not so much that as a profession physicians are unable to do good work in obstetrics. While it is true that there is an appalling amount of ignorance among medical men in obstetric practice, it is likewise true that there is much carelessness and indifference on the part of those who know better. All too frequently, however, both patient and physician are ignorant of the importance and possibilities of good obstetrics with the result that the physician does not acquire knowledge which he deems unnecessary or feels he will not use, and the patient for analogous reasons does not demand what the physician really cannot give and refuses to pay for what she does not receive. The result is that obstetrics in the hands of otherwise competent physicians is not well done, very largely for the reason that it is impossible to give the necessary time and effort for the compensation obtainable. It has thus come about that among the poor the work is left largely to midwives or is done by physicians who under the circumstances have not been able to give even the minimum amount of time to it. The midwife is thus generally regarded as a necessity, even though a very poor makeshift, and the physicians who do the work among the poor, of necessity do it poorly and are not very much to blame. Even among patients able to pay for competent service, such service is frequently not given because not appreciated and not demanded. Even when well done it is difficult to obtain adequate compensation. As a result the average general practitioner has come to dislike the work, puts as little time as possible upon it and asks in the way of compensation just what he feels he can get.

I believe that the question of good obstetrics ultimately will be solved through the education of the lay public and in no other way. Just as soon as the people fully appreciate the importance and possibilities of good obstetrics, much will have been accomplished toward the solution of the problem. It will be for the medical profession, however, to point the way for the proper training of obstetric practitioners and to educate the public very largely through results in practice, but the people themselves must be brought to the point where they will demand good service and provide ways and means for proper compensation.

It is my firm conviction, however, that any scheme for improvement in obstetric teaching and practice which does not contemplate the ultimate elimination of the midwife will not succeed. I say this not alone because midwives can never be taught to practise obstetrics successfully, but most especially because of the moral

effect upon obstetric standards. The lay public will continue to regard with indifference all pleas for improvement in the teaching and practice of obstetrics so long as more than 50 per cent. of confinements are in the hands of ignorant, nonmedical individuals, who, as a class, are regarded as capable of doing the work satisfactorily even by physicians, among whom are certain well-known professors of obstetrics.

There is now on foot, in New York City, and elsewhere a movement to train and license midwives. This movement is doomed to ultimate failure because founded upon a great social injustice, upon a double standard of obstetric practice and upon a wrong conception of what the lay public will sooner or later demand. The midwife can never be taught to practise obstetrics acceptably in the light of modern obstetric ideals. The rapidly growing movement now in progress to secure competent obstetric service for those unable to pay for it, will sooner or later make the midwife obsolete and her elimination inevitable.

The teaching of the clinical or practical side of obstetrics can be accomplished satisfactorily only through the medium of suitably equipped and properly conducted hospitals and dispensaries. Such hospitals and dispensaries should be teaching and research institutions in the fullest and broadest sense of the terms, with a large amount of obstetric material freely and constantly available for the purpose. The teaching staff, and there should be no other, should consist of full-time workers only, who should be paid salaries sufficiently large to make them independent of all other work. This condition of affairs is essential if the teaching is to be maintained at its maximum efficiency and the obstetric material fully utilized as it presents itself. When we speak of clinical teaching in obstetrics we do not refer alone to formal clinical lectures given in an amphitheater, before a score or a hundred students, so many hours a week. On such occasions only cases available at the time can be used so that but a very small part of the clinical teaching can be given in this way, even though well given and most valuable when it occurs. Since labors occur during all hours, both day and night, at irregular, uncertain and unexpected times, obstetric teaching, from the clinical side, must, necessarily, be a continuous performance irrespective of eating, sleeping, resting, recreation or study. Each labor case must be utilized to the fullest to teach and to study all that it offers. This is imperative not only that the student may have the largest possible opportunity during the limited period assigned to him for practical work, but, also, because by using each and every

case as a teaching case, the complications and unusual things are thereby most certainly discovered and utilized to the great advantage of both teacher and student to say nothing of the incalculable benefit to the patient.

The conduct of labor cases is, at best, both time and strength-consuming, but when earnest and conscientious teaching is added thereto, the tax upon the teacher becomes severe, especially when continued over a period of months or even years. For this reason, the teaching staff should be sufficiently large to permit of frequent changes and these should be comparatively short hours, if the best results are to be accomplished.

As previously stated, competent obstetricians cannot be trained by undergraduate instruction alone. On the other hand, much more can and should be done for undergraduate students in obstetrics than has as yet been done in this country. I am fully aware that the four years of undergraduate instruction in medical schools is already so fully occupied that not much more time can be diverted from other subjects for obstetrics. With a system of intensive teaching as above outlined, much more can be given the student, however, than he now receives.

For practical instruction in obstetrics, the student should utilize at least a part of the summer vacation immediately preceding his last school year. If this is not possible, because of limited material or a relatively large number of students, several weeks of the school year should be given to the work, during which time the student should reside in the hospital and be excused from all other school work. During this time he should be given ample opportunity for the examination of pregnant women including vaginal examinations, abdominal palpation, auscultation and pelvimetry. He should follow case after case through labor from beginning to end, always under the most careful supervision and instruction of trained teachers. He should not only be allowed to observe deliveries, but should conduct them as well under supervision and instruction. Opportunity should be given also for repeated vaginal examinations on parturient women—each case of labor being used to the fullest extent for teaching and practice—with due regard, however, for the strictest asepsis.

The student should follow most carefully the puerperal convalescence of every patient in the hospital at the time of his service, especially those whose deliveries he has witnessed or conducted. The care of the babies should form an important part of the hospital instruction. Bathing, care of the eyes, the giving of enemata, the

doing of retractions or circumcisions, inspection of the stools and the modification of cows' milk for infant feeding, should all come in for consideration in the most practical manner. At the close of his hospital service the student should enter the dispensary service, where under close supervision he should be required to care for pregnant, parturient and puerperal women, following the technic, as far as may be practicable, which he has learned in the hospital. Before graduating each student should be required to deliver, under supervision and instruction, at least twenty-five women; and, before going into private practice, he should be required by law to do upon the living subject the obstetric operations which his license gives him permission to perform. This opportunity can readily be supplied in a service of from three months to a year in maternity hospital and dispensary services such as I have attempted to describe.

I shall close with a brief reference to graduate instruction in obstetrics. In order to become a thoroughly trained obstetrician, the graduate student must spend a number of years as assistant and teacher in a maternity hospital and dispensary services of the type already described. The major part of undergraduate instruction should be given by graduate students for this very purpose. The teaching helps them immeasurably. It gives them assurance, makes them alert, teaches them the invaluable art of expression, develops clean cut ideas and thorough methods and accurate clean-cut procedure.

Laboratory studies and research should constitute an indispensable part of all graduate study in obstetrics, not alone for the knowledge which the student acquires and what he adds to the knowledge of the subject, but more especially because of the habit of investigation acquired thereby; all of which will make his research work of the future more fruitful. Aye, more than that, it will prevent him from degenerating into a mere merchant.

DISCUSSION.

THE PRESIDENT.—This is one of the most important papers that has been read before the Association. The men who are being taught obstetrics to-day are the men who will be sitting on these seats occupying the places we are now occupying one-quarter of a century hence. This paper is exceedingly interesting and important, and I hope there will be a free discussion of it.

DR. HENRY SCHWARZ, St. Louis, Missouri.—We all subscribe to the importance of Dr. Ziegler's paper on the importance of teaching obstetrics. The picture he has painted is the desirable one to be attained, and I am sure we all feel more or less that way. We do

not subscribe, however, to all that he has said. For instance, I do not subscribe to the statement that there is no place where obstetrics is being taught thoroughly; that there is no place that has the teaching facilities or system such as he has pointed out. We know that there are some such places, but they are very few and far between.

Dr. Ziegler's paper has disappointed me in this respect, that he has not pointed out the true cause why obstetrics in this country is not taught as it should be. The cause is not in the public; the cause, as he correctly said, is in us. The cause is in the medical schools. Those who are connected with Harvard Medical College, the Johns Hopkins and other leading schools, where they have a professor on surgery, a professor on medicine, or a professor of pathology, could get anything in their community they want, and such men could put obstetrics on a proper footing if they had it in mind or if they had been properly advised. The cause of it to my mind is that obstetrics is circumscribed by not giving to the obstetrician all that belongs to his department.

Dr. Ziegler has painfully abstained from mentioning anything about the diseases of women or about the diseases peculiar to women. He has their welfare at heart, and his institution is to be a woman's clinic in the true sense of the word. We want a woman's clinic. We want our birthright. We want to be obstetricians. An obstetrician does not mean a puller of babies; it means that a man stands by a woman during all the hours that are peculiarly important to her; it means from the cradle to the grave, and we do claim that the teaching and development of obstetrics is stunted when you separate obstetrics from that which the good obstetrician tries to prevent, namely, 50 per cent. of the entire field, and that is gynecology. There is not in a true woman's clinic any thought of dividing obstetrics and gynecology, but when you form associations like this, where you have surgeons and gynecologists and obstetricians, and where three are one and the same thing, you yourselves are instrumental in keeping obstetrics on a lower level. The gynecologists as they like to call themselves, are neither fish nor meat. The gynecologist is the one who causes all trouble in medical schools. He is an abomination to the surgeon. The surgeon would like to attack him as a subdepartment of surgery. He is an abomination likewise to the obstetrician because he interferes with the full development of the obstetrician. You cannot develop an obstetrician such as Dr. Ziegler has in mind unless you give him a full field of activity. If a society such as this would come to a realization of the important service that should be given to the community, by learning to understand this point and by trying to enforce in the medical schools with which we are all more or less connected, a great step would be done to accomplish the ends which are in the mind of Dr. Ziegler. Whenever institutions start out to do things they go to the best brains of the country. Let us take Washington University Medical School of St. Louis as an example. They go to Welch of Baltimore; they go to the Carnegie Foundation; they go to the Rockefeller Institute, they go to Boston, and then they come home and say we

must have full-term teachers in medicine, surgery and pediatrics, etc. That is what they did in St. Louis. Luckily, we would not stand for it, but we had to hammer into the new faculty that there are only three main clinical divisions of medicine, and these are medicine, obstetrics and surgery. Obstetrics first, because you train these men, and when you turn them loose on the public you expect them to do good obstetric work. There is nothing in surgery that the young graduate cannot escape if he wants to, outside of fractures and dislocations and a few of the minor surgical operations which every good graduate can perform. But he does not have to remove the Gasserian ganglion or do gall-stone operations or things of that kind, because there are plenty of experienced surgeons for him to consult at all times and in all places. But in obstetrics the youngest graduate may be called upon to go to a farm several miles away from medical assistance and there he has to do what the case calls for whether it be a case of eclamptic convulsions, a case of contracted pelvis, or a neglected shoulder presentation, or what not, so that there is nothing in the text-books on obstetrics that we can neglect in the teaching. We have to prepare them then in every detail of obstetrics before we can safely turn them loose upon the public. In our school, I am happy to say, we are overcoming the ambition of the surgeon, for instance. Professor Murphy, a very dear freind of mine, came from Harvard to build up the department of surgery in our institution. He understood he was to do all the abdominal operations, to take out fibroids, etc., because that was the way he was brought up. We argued the point a little while, and in arguing we have for years found that we must never get too hot; we must use persuasion and never get ourselves into a place where we say, "Unless you do this, we quit." We do not do that. We fight this way: "Unless you do that which is for the best interest of the institution, we will fight and keep fighting because we will give you no rest unless you do that for which we have stood a lifetime." If the three branches were accorded equal weight in the teaching, equal weight in the passing or not passing of the students, there would be no trouble in making students take the necessary interest in obstetrics. In the first place, they really like to be taught well. They enjoy the work, but you can flunk them just as quick in obstetrics as in medicine or surgery so that we have no difficulty that way. As our friend Dr. Williams says, there is good work done here and there in teaching obstetrics, only it is not done as a rule. They have to do it under difficulties and fights which should not be imposed upon them. There is too much struggle and fighting necessary to insure the safe development of obstetrics.

I do not like to go much further into these things except to say this: It has been an abomination to me, when I come to some of the meetings of our Association to find a program filled with subjects that are absolutely foreign to obstetrics in itself, even including the operative procedures peculiar to women. When I read the By-Laws of the Association I find that our Association is devoted to the advancement of obstetrics, to gynecology and abdominal surgery.

With the good obstetricians increasing in number in the Association, with the pathetic talk we got last night from Findley, of Omaha, and from Ziegler with reference to obstetrics, it may not be long before we will try to change the Constitution and By-Laws, before we will try to cut off abdominal surgery, before we will try to make an association for the advancement of obstetrics and gynecology. That includes all legitimate abdominal surgery that the obstetrician ought to do. We do not want to stir up too much feeling, but at Indianapolis next year we will make a motion in proper form, let it lie over for a year, and then we will exert ourselves to make this Association stand for obstetrics in its extended sense, including gynecology.

Dr. Greer Baughman, Richmond, Virginia.—I have been very much interested in Dr. Ziegler's plan of teaching obstetrics, I think it is ideal, and hope he will be able to carry it out.

I want to say a word or two in regard to the point of eliminating midwives and in advancing the teaching of obstetrics. The situation in regard to the midwife is fast changing, particularly in our section of the country. There is a reason for it, and I believe the same thing can be carried out with you in your towns or cities. Our outside dispensary in obstetrics takes charge of this work. I do not believe it is possible to do away with the midwife under the old method of allowing students to deliver women without competent instructors. There are many women who prefer a midwife they know to a young medical student they do not know. Every case on the outside is demonstrated by a demonstrator. This is troublesome and it requires nine or ten men who are interested in the work, but who do not receive one penny. They do this for what they can learn in teaching students on the outside. It is astonishing the improvement that has taken place in the outside service, and how midwives are being eliminated because we are trying to do the work in that way.

My idea in teaching clinical obstetrics is that absolutely every case should be demonstrated. Ten cases perfectly demonstrated by an intelligent demonstrator are equal to a hundred cases that the student does himself, without instruction.

We have instituted one plan of instruction which is a small thing, but it is the small things that help, and possibly it may not have occurred to you. We have at regular intervals clinical history talks with our boys. We read to a certain point, histories of cases that have occurred in the service including the size of the pelvis, the heart sounds, etc. We tell the student to write down what was done to the woman and what was the result, and after we have collected the answers, we read what really happened to her. Leopold, of Dresden, I believe suggested this plan of instructions and carried it out in a splendid way.

Dr. John Norval Bell, Detroit, Michigan.—A course in obstetrics given to students by these instructors by actual demonstration of patients is ideal, but no matter how many of these nonpaid instructors there are, there will be a time when none of these men

are available. That happens very frequently. In our institution we have four men in our department who are available for demonstration in the homes of patients, but it frequently happens that not one of these men is available when the student calls up. On the other hand, many of these women deliver themselves precipitately, and the student receives no benefit from the case at all. To my way of thinking, all of these cases should be delivered in an institution, such as Dr. Ziegler has for this purpose, where you can teach obstetrics and teach it properly. You can get patients to come in there as soon as their pains develop, and you can demonstrate these cases in the institution. There a doctor is usually available very quickly, and if not, his first assistant, who is resident in the hospital as senior intern in his department, is available, and he can give a scientific demonstration of delivery. In our institution we have the fundamental principles of obstetrics taught in the junior year in the outdoor department. Patients come there and register, and the students are divided into sections. They are taught pelvimetry and external palpation, the location of the fetal heart, and they are taught by the attending staff of the outdoor department. They see a lot of good material and receive excellent instruction in this way. In the senior year they go to the hospital and have the cases demonstrated to them there at the time of delivery. When they go to attend a case in the hospital the outdoor history is brought in, they sit down and look it over, they examine the patient, and go ahead with the delivery, and the students are required to make out a preliminary history of that patient themselves and the history at the time of labor, and required to follow the case up for the first ten or twelve days, to see the patient every day for ten or twelve days after the child is delivered. That, at the present time, is as near ideal as you can get it; but there is not the slightest doubt that the teaching that Dr. Ziegler has outlined is even more ideal, but it is not practical. We are facing a condition and not a theory. I heartily agree with Dr. Schwarz. I did a lot of gynecological work for fifteen years and am still doing it, for in order to be a good obstetrician you must have had a good grounding in gynecology. In other words, to be a good obstetric surgeon, you must have a good knowledge of gynecology. A great many gynecologists so-called are general surgeons and do not know very much about obstetrics. There are a few of us getting into it, but there would be a whole lot more coming into it if the subject was properly taught and more thoroughly understood. Gynecology is a good ground work for the making of a good obstetric surgeon.

Dr. Gordon K. Dickinson, Jersey City, New Jersey.—I love Dr. Schwarz, but I dislike to think that I have to be a good obstetrician as well as an abdominal surgeon, because I am an abdominal surgeon mostly. I feel pretty warm over one thing which correlates the ideas set forth in the paper. You men who have talked so far do not seem to have many worries, but we men with our type of hospitals have great worry over the matter of how to get the next intern. When 90 per cent., I believe, of the graduate doctors

go into hospitals, morally you have an obligation. You men who are connected with medical colleges and are teaching these young men until they graduate and are ready to accept hospital positions, should see to it that certain hospitals are standardized and graded and are universities of instruction. When these young men leave your institution of learning, you should see to it that they get into the proper places to receive proper training and instruction. The biggest part of the literature in our medical journals deals with therapy. We do not often come down to principles. These young men must be taught principles because it is only by knowing the principles of medicine you can think. The boy who cannot think but only work with his fingers is like a carpenter, he will not do for a practitioner of medicine. It is human nature to whittle a stick or to whistle or to do something, but some men do more work with their brains than with their fingers. Hospitals can be made educative centers. We want more interns. I find it hard to get one, although we have a good hospital. You men who have college connections should have an intelligence office and have us on the list and say to each hospital, don't worry, we have had you slated for three years, and we will keep you slated as long as you deliver the goods to the young men.

Dr. James E. King, Buffalo, New York.—I have not been engaged in obstetric work for the last two or three years, nevertheless, I am very much interested in the subject of this paper, and I think that we must all recognize the deficiencies in teaching which Dr. Ziegler has pointed out.

There are two points I wish to emphasize, and the first is in regard to the teaching of obstetrics. It appears to me that too much emphasis is laid upon actual delivery. We instruct the student in how to deliver a case most carefully, and much of the emphasis in the teaching is laid upon this particular part of obstetrics. We show him how to apply forceps on the manikin and on the living subject, and after his graduation we find him applying forceps frequently and not always with good judgment and skill. Much greater emphasis in teaching of obstetrics, I believe should be laid upon the diagnosis of position both before labor has begun and during its progress. In this way, the diagnosis of dystocias and the various abnormal conditions that may be present or arise during labor, can be detected early enough to be corrected. Until this is done, I feel that we are not going to have painstaking obstetrics among the general practitioners.

The second point is with regard to the midwife, and unfortunately I did not hear all that Dr. Ziegler said on that question. At the last meeting of the New York State Medical Association, we had three very illuminating papers upon the subject of the midwife. It was perfectly astonishing to hear in the discussion the various views expressed by some of the men as to the necessity and need for midwives. I do not believe that obstetrics will have its proper place in medicine, until the public are educated to the view that no branch of obstetrics should be in the hands of ignorant women. I,

for one, believe that there is absolutely no excuse for the midwife. She is an importation brought over with the various foreign population that we have in this country; but why we in this country should feel that we must accept her just because she is an institution in Europe, is beyond my comprehension. The midwife problem is one of considerable scope, and apparently there is difficulty in finding a remedy. It would seem that it would be perfectly proper for an association of this character to place itself on record as being absolutely opposed to the midwife, and I think it would be perfectly proper to enter upon our minutes a firm protest against that very unscientific institution.

Dr. Charles L. Bonifield, Cincinnati, Ohio.—I cannot refrain from making a few remarks on this very important subject. In the first place, I want to commend the paper read by Dr. Ziegler. In the second place, I wish for just a minute or two to defend the association of which at the present time I happen to be the head. Because my friend Dr. Schwarz thinks gynecology should be the appendage of obstetrics is to me no reason why intelligent men should not at the same meeting read papers on more diverse subjects than those conditions that are incident to childbearing. I believe in specialization of medicine. I believe any one who wishes to devote himself exclusively to the surgery of the umbilicus should do so. On the other hand, I do not expect to find any man or set of men who will claim that because it is better to subdivide medicine in a certain way, for the purpose of teaching it, that it is necessary for a man to select one of these arbitrary subdivisions for his practice, or that he must keep his interests confined to that special subject.

Dr. Carstens, one of our old wheel horses, told me yesterday that he spent four hours every day in reading medicine. I know that in reading medicine he did not mean only obstetrics or gynecology, but he reads surgery, internal medicine, and everything else. If it is a good thing for us to read up on these subjects in the privacy of our rooms, it is just as good to hear these subjects discussed at a meeting like this. I believe in this association keeping up its broad field of abdominal surgery, gynecology and obstetrics, or if it pleases our friend better, I am perfectly willing to put them in the order he mentioned, namely, obstetrics, gynecology and abdominal surgery. (Laughter.)

I do not attach much importance to a name, but I really see no great reason for changing that of the gynecologist. The word gynecology means a treatise on woman, the word obstetrics means to stand around. Possibly the reason why gynecology to-day slightly overshadows obstetrics is because the obstetricians have been content to stand around while the gynecologists were making rapid strides forward.

Dr. J. Henry Carstens, Detroit, Michigan.—It seems to me, this is a complicated question, and after having passed through all the different stages during an experience of about twenty years in each line, I look at the subject a little differently from some of my friends. I taught obstetrics for twenty years, and then gynecology for

twenty years, and now I am teaching abdominal surgery. There are several points to be considered about it. First, into this country there came in the last century in the fifth decade the Irish and in the eighth decade came the Germans who were used to having midwives, and in the course of time these women bore children, and subsequently their children bore other children and we have educated them to employ doctors. Then came into this country the Poles, we have educated them, but later came the Armenians, and other nationalities, and they are used to midwives. Most of those people came to this country poor, they have not money to engage a doctor, they cannot pay a doctor what he ought to have for his services, and the result is they take midwives. But by and by these people will also be educated to employ doctors in cases of obstetrics and will have them all the time. But for the reasons I have mentioned it will not be an easy matter to get rid of the midwives, but I believe with Dr. Ziegler that we ought to get rid of them as soon as possible. Who are the obstetricians in the country to-day? Not you and I. No. The obstetricians in the country to-day are the general practitioners. They are the ones, and to have these obstetrical papers read before us does not do any good. These papers ought to be read before a society of general practitioners, before the internal medicine man. They ought to be thoroughly drilled in obstetrics, and so I agree with Dr. Ziegler we ought to drill into our medical students a thorough knowledge of obstetrics. We should educate them to take an interest in it, but what is the result? Students will learn it, we give them good instruction, and plenty of cases to handle, they know all about it, and they go out and practise it. If they practise in the country they have got to do obstetrics, and they do it. If they practise in a city what do they do? They do not practise obstetrics very long. They want to be specialists of some kind. Obstetrics is hard work, and it does not pay very well. I practised obstetrics for twenty years, and I know it is hard work. I have delivered as many as 200 women a year, and every one here knows to deliver 200 women in private practice, besides attending to other duties, means that you are called out every night, and I do not care what kind of a constitution you may have, there is a time coming when you cannot do that work any more. You cannot keep it up forever unless you limit yourself to a few dozen cases, and that does not do any good to the community. You must understand that many of us are getting older, we are getting tired of obstetrics, and we drift into other surgical work. There are many men who do not practise obstetrics, while others do. It occurs to me whether it would not be a good idea to have a large obstetricial society in this country for men who could and would devote themselves especially to obstetrics and would have a society for themselves where they could discuss this. I do not know that the time is ripe for that. Personally, I take as much interest in the obstetrical papers as I do in the gynecological or those on abdominal surgery, and I think the obstetricians should be able to stand a few papers on abdominal surgery and gynecology.

Dr. Ziegler (closing the discussion).—If I had been given an hour or even two hours to discuss this subject, I could have expressed my view more fully and doubtless more accurately. I fully agree with all that Dr. Schwarz has said but in twenty minutes it was hardly to be expected that I would cover fully the subject which I have brought before you. I do not teach gynecology in the University and therefore have not discussed it in my paper. In the New Magee Hospital, however, we will practise both obstetrics and gynecology and will teach them both to post-graduate students even though we teach obstetrics only to under-graduate students. The Pittsburgh members of our association will testify to the vigor and persistence with which I have advocated the inseparable combination of obstetrics and gynecology. I have met with so little support and with so much opposition that after a time the contention has grown monotonous and so I have purposely confined my paper to the teaching of obstetrics. For this very reason I am especially pleased to have Dr. Schwarz criticise my omission.

If Dr. Schwarz will read my paper carefully he will agree that I did not say that there are no institutions in this country where obstetrics is taught as I have advocated. I admitted that there are a few and of course Dr. Schwarz's institution was included in this number.

Personally I feel very strongly on this subject. I think we are all of the opinion that a certain amount of didactic teaching is indispensable. When it comes to the practical side of obstetrics, there are but few institutions, even now, giving the students what they should have. In most obstetric-teaching institutions the students witness deliveries only. They are advised what to do, but in very few institutions do they actually conduct confinements under supervision and instruction. We learn to do by doing and in no other way and unless our students actually do the work they will go out into practice with little more knowledge of the subject than if the teaching were entirely didactic. In our work at the hospital three students are on duty at a time. Each student gives the anesthetics for four cases during the close of the second stage; as second assistant, he counts the fetal heart sounds, observes the character, duration and frequency of the pains and controls the fundus and uterine contractions during and following the third stage of labor for four cases; and as senior assistant, he assists with the ninth case and finally delivers under supervision and instruction, the tenth, eleventh and twelfth cases in his service. At the close of his service in the hospital the student is sent into the out-patient service where he conducts four more cases under supervision and instruction. He is thus present at a minimum of sixteen cases of labor, seven of which he has personally conducted under instruction and supervision. If his work has been satisfactory he is then permitted to conduct alone and upon his own responsibility as many additional cases as he has the time and inclination for.

In spite of what Dr. Schwarz has said, I still think that the responsibility for poor obstetrics rests very largely with the people.

They do not have the respect for obstetrics that they should have. Midwives are doing a large part of the work. The people naturally feel that if midwives can do the work satisfactorily, little medical education is necessary. I believe that the midwives may be supplanted by maternity dispensaries. The trouble is that the profession is not united on this subject. Many physicians profess to believe that midwives can do the work satisfactorily and are indispensable. Others believe, as I do, that we can get along without them. So long as the profession is not agreed upon the matter, the people will not give money to eliminate the midwife. On the other hand, money will be promptly forthcoming just as soon as the people are convinced of the necessity of physicians and nurses doing the work. In three and a half years, I have collected and spent almost $50,000, in maternity dispensary work and I have done it alone and without a particle of assistance from a single physician in the city. We have four physicians, five nurses and a social worker on our dispensary staff. They are on salaries and devote their entire time to the work. We expect to secure pledges of $20,000 a year for the next five years to carry on the work which is growing rapidly. We are now caring for about a hundred confinements a month and making over a thousand visits a month in the homes. I know what I am talking about when I say that if the physicians of the city were agreed that the midwives should be supplanted by physicians and nurses, the thing would be accomplished in less than a year and there would be no trouble in getting the money.

THE COMBINED OPERATION FOR THE INTERRUPTION OF PREGNANCY AND STERILIZATION.

BY

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THE interruption of pregnancy at whatever stage and by whatever means is at best a grave procedure. The gravity of the operation does not rest alone in the determination of the indication but as well in the manner of execution. None of the recognized procedures are without danger and experience has taught us that there is an element of uncertainty in all operations.

Where it becomes imperative to interrupt pregnancy for physical conditions which are to remain a lasting obstacle to future childbearing, the method by which this may be done with the minimum of risk is that first proposed by Sellheim.(1) The procedure consists of a combination of abdominal hysterotomy and resection of the Fallopian tubes.

The author has performed this combined operation on four occasions and is convinced that the dangers attending the interruption of pregnancy are minimized by removing the ovum through a fundal incision. There is little risk of infection and the dangers of perforation of the uterus and of overlooking placental remains are wholly eliminated. Furthermore, there is a minimum of blood lost and of time consumed in the operation.

Anderes(2) says that in a series of cases in which pregnancy was interrupted and the proposed sterilization was postponed for a future time, it often happened that a second pregnancy intervened before the return of the patient, thus necessitating a second interruption of pregnancy with its attending dangers.

The following technic is employed by the author: 1. Hypodermic injection of pituitrin (1 c.c.) given five minutes before operating. 2. Median abdominal incision. 3. Transverse fundal incision, the incision extending from tube to tube. 4. Enucleation of the ovum with the fingers and inspection of the entire uterine cavity. 5. Closure of the uterine incision by a double row of catgut sutures. 6.

Double ligatures passed about either tube with resection of one-half inch of the tube between ligatures and enveloping the severed ends of the tubes between the layers of the broad ligaments. In removing the ovum, the fingers may be reinforced by the placental forceps or a swab of gauze, thereby insuring the complete emptying of the uterus under direct inspection and with the minimum of injury to the uterus.

In the four cases in which the above technic was used, the following indications were presented:

Case I.—Primipara, aged twenty-three, pregnant eight weeks, presented a combination of active tuberculosis of the lungs and latent tuberculosis of the left hip-joint with ankylosis and marked abduction of the thigh. So great was the abduction of the thigh that it was impossible to dilate the cervix with instruments and the author was forced to do an abdominal hysterotomy for the interruption of pregnancy. Following the emptying of the uterus through a fundal incision, the tubes were resected.

Case II.—Mrs. L., forty-two years of age, had eleven living children, the youngest one year of age. She was poorly nourished, was suffering from an exophthalmic goiter and a mitral lesion with evidences of incompetency and was in the fourth month of gestation at the time of operation. The combined operation of interruption of pregnancy and sterilization was performed with little or no depression.

Case III.—Mrs. B., aged forty-three, mother of three children, weighed 228 pounds three years ago, but had lost 100 pounds since that time. She was four months pregnant, had been unable to take nourishment for the past month, and as a consequence was extremely depressed. The posterior surface of the uterus was adherent to the rectum and both ovaries were firmly embedded in adhesions. In the operation the adhesions were severed, one ovary and tube removed, the opposite tube resected, and the ovum removed through a transverse fundal incision.

Case IV.—Mrs. L., aged thirty-four, para-iv, now in the fourth month of gestation. Patient had lost some 40 pounds in weight in the past six months, was suffering from persistent vertigo, disturbed vision, constant headaches, rapid heart beat, low grade of temperature and increasing weakness. She was kept in the hospital under observation for three weeks. No focal infection could be found, but it was evident that she was suffering from some sort of toxemia. Her condition became increasingly grave. In view of the facts that she was thirty-four years of age, had four living children and that the symptoms antedated her pregnancy by two months, it was determined to execute the combined operation of hysterotomy and resection of the tubes. The convalescence was slow but complete, with the exception of disturbed vision which has not as yet wholly disappeared.

The convalescence of these four cases was more satisfactory than could have been expected from any other method that might have been employed to meet the double indication of interruption of pregnancy and sterilization.

These cases will serve as types of a limited class of cases which call, not alone for the interruption of an existing pregnancy, but for the guarantee that there will be no future pregnancies. It is needless to add that the indication for such a radical procedure must be a permanent disability, wholly incompatible with pregnancy; *i.e.*, incompetent heart lesions, aggravated forms of exophthalmic goiter, active tuberculosis, grave psychoses and chronic nephritis. The procedure is naturally more adaptable to women who have given birth to one or more children.

Fromme and Jaschike argued in favor of the operation in the Fourteenth German Gynecological Congress at Halle, and we find it an established practice in the clinic of Zurich.

Dutzmann reported satisfactory results at the Fourteenth German Gynecological Congress, 1911, in a similar procedure performed per vaginam. A longitudinal incision was made through the anterior vaginal wall, the bladder reflected from the uterus and the vesico-uterine fold opened. The uterus was then drawn forward and opened by a longitudinal median incision, the ovum extracted by means of the fingers and the decidua curetted. A strip of sterile gauze was passed into the cavity of the uterus and out through the cervix into the vagina. The uterine incision was then sutured, the tubes resected, and the fundus fixed to the anterior vaginal wall. As remarked by Hofmann(3) the vaginal operation of Dutzmann is not applicable to pregnancies beyond the fourth month and is not so free from the dangers of sepsis as is the abdominal operation.

Hofmann reported twenty cases with the following indications: Pulmonary tuberculosis, eleven cases; cardiac lesions with failure of compensation, three cases; chronic nephritis, three cases; renal calculus with anuria, one case; psychosis, two cases.

CONCLUSIONS.

1. The combination of abdominal hysterotomy and resection of the Fallopian tubes is the procedure of choice in all cases not previously infected.

2. The removal of the ovum through an abdominal incision should be reserved for those cases in which permanent sterilization is desired.

3. No other method is so free from the dangers of sepsis, retained secundines, perforation of the uterus and excessive loss of blood.

4. In point of safety, expediency and efficiency the procedure will appeal to all abdominal surgeons.

REFERENCES.

1. *Monatschr. für Geb. u. Gyn.*, Bd. xxxviii, H. 2.
2. *Monatschr. f. Gyn.*, Oct., 1914, Bd. xl, H. 4.
3. *Zeitschr. f. Geb. u. Gyn.*, Bd. lxxv, H. 2, S. 320.

DISCUSSION.

Dr. Samuel W. Bandler, New York City.—I am very glad that Dr. Findley has called our attention to the indications for interfering with the progress of pregnancy. A rule which I have adopted for myself these many years is as follows: If any patient, who for any genuine reason ought to have no more children, is pregnant, and if her physician in conjunction with me or I in conjunction with another physician feel that she ought not to have any more children, including the one she is going to have, I remove that embryo from the uterus, provided, and only provided, she allows me to sterilize her. So I have followed that procedure in several instances, not however removing the embryo from the uterus by abdominal hysterotomy, but in the usual way and then preventing the subsequent occurrence of pregnancy by an operation on the tubes. In a very early case, where the patient is pregnant eight or ten weeks, one may safely curet and through a T-incision through the vagna separate the bladder, bring the uterus out and take care of the tubes. When, however, the patient is pregnant three or four months, I curet and do an abdominal operation. There is one little difference in my technic, possibly, and that is, instead of doing as I formerly did, tying two ligatures, resecting between the two, pushing the uterine end in a double fold of peritoneum, I make an incision at the uterine horn and simply close the peritoneum over it. That is a simple method and I feel rather more secure. That method is the one I follow in ligating or resecting tubes in the vaginal operation, the Duhrssen vaginal operation for a total prolapse, where no further pregnancies should be permitted.

Dr. Findley (closing the discussion).—I would recommend that Dr. Bandler try the interruption of pregnancy through a fundal incision when he has an opportunity to do so. Most of us, as our experience grows, become less and less cock sure that we can remove all placental tissue by means of the placental forceps, and we are always fearful lest we puncture the uterus, however careful we may be. I do not consume more than twenty minutes in doing the combined operation.

SURGICAL OPERATIONS DURING THE PREGNANT STATE.

BY

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When a huntsman expects to do some shooting, he not only examines the magazine of his gun to see that it is in good working order, but he also inspects the rest of his fowling piece to ascertain if it is in any way defective. This is a principle that would admirably apply to a woman who expects to become pregnant.

The organism of a woman expecting pregnancy should be in good working order, and any defects, that may exist, should be corrected before she permits herself to become impregnated.

This chapter of a woman's life is not dwelt upon with sufficient emphasis, as is evidenced by the ignoring of even the minor ailments that are so frequently present. I have reference to a diseased state of the teeth and gums, and to hemorrhoidal conditions. Much discomfort and suffering can be spared a pregnant woman by having such conditions properly attended to either before or during the early period of gestation. It cannot be denied that a woman, when pregnant, is in her happiest sphere when she can be left alone; the state of her sympathetic nervous system demands it.

A surgical operation upon a pregnant woman is fraught with uncertainty and anxious apprehension. Not that the operation may prove unsuccessful; but from fear of interrupting pregnancy. It is only logical to reason that the organism has quite enough to do; and that an additional strain, such as a surgical operation must tax the patient to the utmost. Furthermore, we have no definite guide to help us in our judgment as to the disposition of a uterus to abort in any stage of gestation.

There is a certain satisfaction to be derived from the wealth of material bearing on this subject. It is believed that an imperative major operation, of whatsoever nature, performed during the pregnant state, does not influence the progress of pregnancy other than to favor its continuance, provided no septic process with its continued high temperature results in the death of the fetus and causes abortion.

High temperature following an acute infection is usually fatal to the fetus in a few days. The presence of pus is the most formidable pathologic factor. Even in cases of pus collection, should the pregnancy continue, the consequences of a suppurative process in the pelvic zone may result in the formation of adhesions of sufficient extent and strength to seriously impede an otherwise normal labor. The mention of pus conditions in the pelvic region brings us to a very interesting and exceedingly frequent complication of pregnancy.

Appendicitis.—My experience with this complication leaves for me but one choice in dealing with this disease, and that is to operate as soon as the diagnosis is made. I even go so far as to demand an exploratory operation in all cases where there is a strong suspicion of the existence of appendicitis. Through such a procedure, very little harm, if any, can occur, and a far more serious trouble may be anticipated and the patients life saved.

Although pregnancy does not in any way predispose to appendicitis, there is no doubt that it has an unwholesome influence on a dormant appendiceal lesion which may rapidly kindle the spark and cause the conflagration of a violent appendicitis. This may be explained upon the ground that the naturally increased blood supply during pregnancy to the pelvic viscera, may embarrass an old damaged appendix. An increased blood supply that is constant to an invalided organ results in an edema. As a consequence, a vascular stasis follows and gangrene and perforation may occur in a surprisingly short time. Other factors, prone to excite a chronically diseased appendix into activity, are an associated constipation and traction upon the broad ligament when the enlarged uterus ascends into the abdominal cavity. The principal cause, however, is the increased blood supply to the pelvic viscera, a portion of which finds its way to the appendix. If it were possible to determine definitely the exciting cause of an attack, and to ascertain the previously existing damage to the appendix, operative treatment might or might not be deferred. As it is impossible to determine these conditions, an immediate operation becomes imperative simply and solely for the safety of the patient. Appendicitis is a vicious disease; it harbors stunning surprises. The disease is most deceptive in its course and termination and our only safeguard lies in the removal of the offending organ. To anticipate the formation of pus in cases of this kind, not only means the saving of possibly two lives, but it also means a short convalescence and an intact abdominal wall for the patient.

Surgical intervention for appendicitis during pregnancy is not a matter of election, and should be performed regardless of any accepted ruling as to the most propitious time for operation. It is axiomatic that operations of choice on a pregnant woman should not be performed at a time when a woman would be menstruating were she not pregnant; *i.e.*, the best time to operate would be when there is the least amount of uterine excitability. It is well to bear in mind that sedatives, and even narcotics, freely administered before and after the operation, will prove very beneficial in controling much of any excitability of reflex nature.

Of five cases of appendicitis during the pregnant state, between the fourth and the seventh months, where pus was encountered, three aborted—all within five days. The other two went to full term, having a normal labor.

Of twenty-eight cases of appendicitis during pregnancy between the second and the fifth months, where no pus was encountered, there were no abortions.

Two cases of appendicitis, one occurring during the sixth month and the other during the seventh month of pregnancy, suffered no untoward results from the operation.

The cause of abortion in the pus cases must not be attributed wholly to the operative measure. I am disposed to believe that the continued high temperatures and the drainage material used, are equally important factors. A few days of high temperature will, usually, suffice to kill the fetus; whereas gauze not properly enveloped with rubber tissue, may through its irritating influence, cause a reflex excitability sufficiently severe to provoke an abortion.

Tumors.—In my experience with tumors complicating pregnancy, I have had some interesting surprises. One of my greatest was in a case where the complicating myoma grew with such rapidity that I felt justified in recommending an operation for its removal. My request was promptly refused. The woman went to full term, and was successfully delivered. All she suffered was a moderately severe postpartum hemorrhage. Within six months after birth of the child, the tumor, which had attained the size of a man's head during pregnancy, had dwindled to the size of an orange.

Another patient, primipara, pregnant five months, noticed three tumors, each the size of a goose egg, on the right side of her abdomen. The tumors were sessile and intimately connected with the uterus. Although the patient was greatly excited over the discovery, her anxiety was assuaged, and she went to full term. In due time she was sent to the hospital. Every preparation for possible accidents

during labor was made. She went into labor at 11 A. M., and delivered herself within two hour without assistance or accident. I arrived in time to deliver the placenta.

These two cases furnished splendid food for thought and disarmed me of any surgical aggressiveness in cases of this kind with which I came in contact. Happily, the cases above related occurred in the early years of my practice and left a profound impression. Probably the safest precept to follow in pregnancy complicated by fibroids, is to let the condition alone until complications arise which demand operative interference. The character and extent of the operation will depend upon the nature and locality of the tumor.

With all the consoling evidence to encourage us, and the dictum to entertain the most conservative views of the management of hese tumors to guide us, we, nevertheless, feel that the life of a woman, in whom fibroids complicate pregnancy, is not without danger, either during the period of gestation, labor, or during the puerperium. A subperitoneal fibroid of the fundus is harmless if it has no long pedicle; if it has, the pedicle may be twisted, or be displaced downward. These tumors, when small, by their intra-pelvic position, give trouble chiefly through their pressure effects. By their increased growth, they incarcerate the uterus and create a marked tendency to abortion during the first three months of gestation. Some of these tumors may be removed without interrupting pregnancy; particularly is this true when the removal is accomplished before the placenta becomes a separate organ. A pedunculated fibroid should offer no difficulties in its removal. A sessile tumor, however, may present very serious difficulties, and it would be well to closely inspect the tumor before its removal is undertaken. In a tumor giving evidence of degenerative changes, a myomectomy should not be considered, the liability to sepsis being too great. It would be far more to the interest of the patient to count the possibility of allowing the fetus to become viable, and then deliver by Cesarean section with ablation of the uterus.

A sessile tumor, with deep-seated base, should not be attacked. There is great danger of hemorrhage, or of rupture of the sutured uterine wound in these cases. A myomectomy always calls for properly selected cases. Multiple tumors, complicating a pregnancy, contraindicate myomectomy. Myomectomy during pregnancy is a serious procedure. The ablest men speak of it as an unjustifiable procedure. When I look back upon the four successful myomectomies I have done, and remember that every one of the women went to term, I appreciate my good fortune.

Interstitial and submucous fibroids, are prone to cause distocia, give rise to postpartum hemorrhage and adherent placenta. The latter complication is one that often invites sepsis on account of injury that may occur to the tumor during the manual ablation of the placenta. Intraligamentous tumors constitute, as a rule, a serious impediment to labor.

Abortion occurring in submucous fibroids and in those tumors producing incarceration, has a maternal mortality of 12 per cent. In pregnancies complicated by submucous fibroids, and advanced to full term, the maternal mortality is 77 per cent. (La Four). Many are the unusual conditions that present themselves when such cases come to labor. The presentations are often abnormal. Prolapse of the cord, and of the extremities is frequent; placenta previa is common, inefficient uterine contraction is the rule; profuse hemorrhage is a constant source of dread and apprehension, the possibility of rupture of the uterus must not be lost sight of; and complete occlusion of the birth canal is one of the possibilities. During the third stage of labor, hemorrhage may be a most serious complication. After labor, involution is always slow in these cases; a septic endometritis with softening of the tumor, general sepsis and an early death, marks many of them; sometimes there is sloughing of the tumor, chronic sepsis, exhaustion, and death.

With such a discouraging picture before us, the greatest care and judgment should be exercised that surgical measures are instituted at a time when they will do the most good and before the patient has reached a stage when any of the procedures must prove unavailing. It is, indeed, a most weighty problem for the obstetric surgeon to decide. Two lives are to be saved; that of the mother, however, takes precedence.

The behavior of submucous, interstitial, and intraligamentous fibroids, may be such as not to menace gestation; when that is the case, the pregnancy should be permitted to advance until the period of viability, and a Cesarean section, followed by hysterectomy, is the proper procedure.

Cervical myomata grow rapidly during gestation and, usually, prove a decided barrier to delivery. Vaginal enucleation or amputation of the tumor should be done at the earliest date possible. The operation is often followed by severe hemorrhage and difficult of control. Many surgeons militate against this risk by resorting to more radical measures.

Should a cervical myoma prove too great a risk for removal, on

account of the size it has attained, it would be advisable to follow the same rule as in the other varieties of uterine myomata, namely, to wait for the viability of the child, and then perform Cesarean section followed by hysterectomy. This would be the elected procedure. It may happen, however, that a cervical myoma, or an intraligamentous tumor, causes serious pressure symptoms before the period of viability has been reached. Then hysterectomy, irrespective of pregnancy, should be performed.

Cases of myomata complicating pregnancy coming under my care were: nine subperitoneal tumors, all sessile. Four cases were subjected to myomectomy on account of rapid growth and incarceration between the third and fifth months; no abortion. Of the other five cases, three went to full term, and two miscarried at the fifth and seventh months respectively. All recovered. In the three cases, where myomectomy was successfully performed, the uterine balance was quite disturbed, as was evidenced by pain that presaged an impending abortion. With the aid of opiates, the organs regained their normal equipoise within a few days. The other case of myomectomy progressed most favorably and gave no evidence of the surgical infliction.

In one case of interstitial tumor operation was refused. Patient miscarried in the seventh month and perished from sepsis two months later.

In two cases of intraligamentous tumors, operation was refused. One case aborted in the third month, and the other in the fourth month. Both patients recovered. They were operated successfully later.

One cervical myoma, the size of a hen's egg was removed during the second month. No abortion.

I wish to add two cases of myoma where hysterectomy had been performed and the discovery of pregnancy was made after operation. The respective ages of these patients were forty-three years and fifty-two years. Positive assurance had been given that pregnancy was out of the question. This assertion was accepted in full, as there were no signs that could disprove it.

While dwelling upon tumor conditions, I wish to refer to one case where a woman, thirty-two years of age and pregnant in the fifth month, noticed a growth the size of a hen's egg in the lower and outer quadrant of her left breast. This tumor gave evidence of rapid growth. Radical operation was proposed and accepted two months later. The tumor proved malignant. Pregnancy went to full term. This is the first instance that has come under my observation

where a tumor in the breast had been excited to rapid growth during the pregnant state.

A case of interest is one of a woman, twenty-eight years of age, who had been suffering from a sarcoma of the left breast for eighteen months. During these eighteen months, she became pregnant twice and aborted during the second and third months respectively. She was not willing to have the breast removed until ulcerative conditions began to show themselves some months later. Five months after the operation, the woman became pregnant and is now overtime. In this case, was it the breast malignancy, or was it a psychic potency that was influential in bringing about these abortions?

Ovarian Cyst.—An ovarian complication, in the character of a cyst, greatly jeopardizes a pregnant woman's well-being. Statistics show that 30 per cent. of cases abort if not operated upon, while the percentage of abortions after operation is about 18 per cent. The maternal operative mortality is about 2 per cent.

An ovarian cyst may be unsuspected before conception and its clinical existence may date from the occurrence of pregnancy. The growth of nearly all ovarian cysts is usually rapid. They are liable to the danger of torsion, which occurs three times as frequently as in the nonpregnant woman and often cause distress by pressure. Rupture of an ovarian cyst is always a possibility during pregnancy.

As soon as the diagnosis of ovarian cyst is made, operation is indicated. In two cases operated on during the fourth and sixth months of pregnancy, gestation was not interrupted.

Hofmeier has given us a rule for which the profoundest regard should be entertained. He says: "Operate on practically all ovarian tumors and defer operation in practically all myomata as long as possible."

Cancer.—Cancer of the cervix of the uterus in pregnancy is not uncommon. This is one of the most discouraging conditions a surgeon can meet. His word, offered in the strongest convincing sense that can be reflected in the light of our present knowledge of cancer, can only be accepted by the woman so afflicted in a relative manner. Her word, too, in this matter must be respected and the given case must be conducted to a certain extent on principles that accrue not only from the state of the pregnant woman, but also from her expressed wish.

Cancer predisposes to abortion and its growth during pregnancy is usually very rapid. If the cancerous condition appears to be

incipient, the affected portion of the cervix can be removed with a fairly good chance of not disturbing gestation. The greatest encouragement can be entertained when the operation is performed before the fifth month.

In the more advanced stage of the disease, if consent can be obtained, a hysterectomy should be performed without reference to the life of the child. It is most likely, however, that such consent will not be given, and that the patient is willing to take a chance. A serious question, based upon statistics, forces itself here upon the surgeon. Can he conscientiously take an imperative stand against the patient under such conditions and insist upon a radical operation? Can he, in the face of the patient's objections, demand that the child be sacrificed and the mother given her chance? Judging from the end results of carcinoma of the uterus as they are known to us to-day, I doubt very much if the surgeon has a right to assume this imperative attitude. An exception is the case seen near the period of viability; here a few weeks of waiting will not materially increase the existing dangers.

The treatment of cancer complicating pregnancy should be radical. If the patient has gone to almost full term and the child is still alive, the preferable delivery is by Cesarean section followed either by a total extirpation of the uterus, or, if the patient's condition does not permit of the total ablation, a rapidly performed Porro operation should be substituted. Delivery in the more favorable cases can be accomplished by the vaginal Cesarean section of Dührssen, followed by vaginal total extirpation. In the still more favorable cases, when the cancerous condition seems only obstructive, delivery may be satisfactorily accomplished with forceps or version after the mass has been extensively incised. Hysterectomy should be done at once.

The treatment of cancer complicating pregnancy depends entirely upon the progress the disease has made in the given case. It requires an experienced operator to judge such a condition correctly. My experience with this condition (private patients) comprises six cases. All were well advanced when first seen. Radical operation was refused in every case. One of the six cases was subjected to cauterization during the fifth month of pregnancy. She miscarried in the seventh month and died four months later. The rest of the cases dropped into other hands. Two of these died before term, presumably from hemorrhage. The fate of the other three I have not been able to learn.

Other cases coming under my care with lesions that were coex-

istent with pregnancy and in which operation could not be deferred were three cases of gall-bladder disease, one case of renal calculus, and two cases of ventrofixation that so anchored the enlarging uterus that release became imperative. Operative measures exercised no untoward influence upon the patient and pregnancy went to term. All patients were operated not later than the sixth month.

For the relief of hemorrhoids that demanded a surgical measure on account of the severe suffering the condition caused the patient, I operated on eight pregnant women, two of whom promptly aborted. The operation in each case was performed before the fourth month. An operation of this character in a pregnant woman should be the least radical, as the reflex excitability is unusually pronounced when these structures are subjected to trauma. One has only to recall the long time it requires for a patient (not pregnant) to urinate unassisted after an operation for hemorrhoids to become convinced of the profound reflex excitability that is engendered by the surgical invasion of these parts.

A vaginal fistula in a woman four months pregnant, which I attempted to close in order that the risk of infection during the puerperium might be eliminated from this source, resulted so promptly in an abortion that my surprise was beyond expression. In looking up the statistics, I found that 44 per cent. of abortions followed operations for vaginal fistula.

My conclusions gleaned from the studies of a limited experience with surgical lesions complicating or coexisting with pregnancy can be expressed briefly:

1. A woman expecting to become pregnant should be thoroughly examined for any physical defect.

2. Such a defect should be corrected, if possible, before pregnancy takes place.

3. No operation that can be deferred should be performed upon a pregnant woman.

4. Any operation that will contribute to the safety of a pregnant woman should be performed without hesitancy.

DISCUSSION.

Dr. Henry Schwarz, St. Louis, Missouri.—I am not willing that Dr. Reder's paper should go undiscussed, although I have not much to add to what he has said. The complication of fibroids with pregnancy requires a great deal of discrimination, and Dr. Reder most likely would have brought out the possibilities of the complications of fibroids with pregnancy had he been given time to have finished his paper. In a long experience most of us have seen cases

of fibroids of the myomatous type in which the muscle tissue predominated undergo involution almost the same as the musculature of the uterus. I have seen fibroids the size of a child's head disappear. On the other hand, there are fibroids met with during pregnancy which do not give any complications at the time of delivery, and these can be delivered or taken away later as the case may require. If, however, the fibroid is found in the culdesac of Douglas, and most likely will obstruct the birth canal, it should be taken out, and the sooner it is done the better. I have removed fibroids the size of a cocoanut from the lower end of the uterus without opening the uterine canal and without interrupting pregnancy. Then again, a good many women will not go to full term and we are expected to remove the fibromatous uterus when we do a Cesarean section. In one exceptional case I did not remove the uterus. A woman came to the hospital in a sapremic condition, with a dead fetus, it being her first pregnancy, and the fibroid was located in the broad ligament. It was the size of a child's head. I did a Cesarean section, and at first wanted to remove the uterus, but when I could remove the fibroid I did so. The woman is now pregnant and she will be delivered through the natural passages.

What Dr. Reder said about women being examined before they became pregnant and of getting all the information one can in regard to the cases is interesting, but most of the babies do not come into the world so well planned. (Laughter.)

Dr. J. Henry Carstens, Detroit, Michigan.—I can agree with what the doctor has said in regard to these tumors complicating pregnancy. I have had cases of strangulated hernia and gall-stones complicating pregnancy, and particularly ovarian tumors. Ovarian tumors are sometimes very rapid in their growth, they distend the abdomen to such an extent that we have to do something to relieve the woman. But I think the general principle the essayist has enunciated is correct, that where it is possible we should not operate. On the other hand, if the case is acute, and there is danger of suppuration, we had better operate early because we know that in the presence of any septic condition the woman is liable to abort. That is a great principle that should guide us.

Dr. O. H. Elbrecht, St. Louis, Missouri.—I recall a series of twenty-eight pregnant women who had fibroid tumors or other conditions complicating pregnancy, and at the time I looked up the literature very thoroughly, and found it tallied with my own experience. The women who are most apt to miscarry or abort are those who are toxic or in whom suppuration has taken place. You can operate on an obstructing gall-stone or a kidney stone, and if you have not very much pus or toxemia to deal with, and will use prophylactic measures to prevent abortion or miscarriage, you are apt to be successful.

Just what was said in regard to peritonitis and in giving large doses of opium applies more particularly to this class of work. I should say, do not wait until you get contractions, but give the patient plenty of morphin before operation; do not wait until the

patient is wide awake and dozing but give her morphin as soon after the anesthetic as possible and keep her under the influence of it. If you inhibit the impulse to abort you have a chance to save the fetus, whereas if you wait and let it go on, abortion is inevitable. I believe that the cardinal principle to avoid miscarriage or abortion in this class of cases is to keep them loaded with morphin from the start and you will be successful. The cases you do not save are those in which you put in drains and those in which you find pus and toxemia. I believe if you will bear in mind what I have said and carry out the principles I have enunciated, you will save more babies than you would if you waited a while before giving morphia.

Dr. Hugo O. Pantzer, Indianapolis, Indiana.—I am in hearty accord with what has been said by the essayist in regard to tumors or other pathological conditions complicating pregnancy. I wish to report a case of extreme interest which pertained to a woman who was about five months pregnant with twins and had a dermoid cyst when she came to my hospital. She gave the history of having had in the preceding three or four weeks repeated attacks of pelvic pain, sharp and lancing and lasting each through several days. Examination revealed a large immovable tumor to the right and back of the uterus, filling practically all that part of the pelvis. There was no choice in this case but to operate. I found a dermoid cyst, which under the stimulus of the pregnancy, I assumed attained increased growth until it had repeatedly burst its confining sac, with the result that nature threw out plastic material to cover-in the protruded material and adhesions would form, which for the while were a barrier against further extrusion of contents. Then in another three or four days or a week a further similar attack would follow. The firm adhesions at operation were freed with greatest difficulty, and not unexpectedly the uterus discharged its contents within a short time.

Dr. Reder (closing the discussion).—In presenting my paper I was anxious to get to the portion dealing with cancer during the pregnant state which is an exceedingly interesting chapter. What Dr. Pantzer said about ovarian cysts recalls the dictum of Hofmeier, namely: operate in practically all ovarian tumors, and defer operation in practically all myomata as long as possible.

THE VALUE OF PITUITARY EXTRACT IN OBSTETRICS AND GYNECOLOGY.

BY

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I MIGHT well begin this paper with the phrase: "When the head is well molded and fixed in and through the brim of the pelvis." This phrase evidences my conviction as to one of the essential preliminaries which *ought* to obtain in primigravidæ before pituitary extract may be used by the general medical man. Whatever the stage, this rule does not hold good in women who have had one or more children, because in them the head is rarely fixed in the brim before labor or in the early stage of labor. Here we are guided by the history of previous labor or labors, and the only question is the size of the pelvis and the size of the fetus.

In a woman who is bearing her first child, the important consideration is the proper relation of the head to the pelvic bones. So soon as one finds that the head is well molded and firmly engaged in and through the brim, the essential risk is passed. From that time on we are assured of a safe even if a tedious labor. With perfect assurance we may promise a living child.

Here comes the important point in favor of pituitary extract. It diminishes the necessity for forceps most decidedly, in fact, in my own private practice, it has almost entirely abolished the use of forceps. When formerly the second stage was more or less prolonged, uterine contraction weak and inertia ensued, forceps were used. Now I am able to deliver practically all my normal cases with the aid of pituitary extract.

Another thing, and this is a point of the greatest importance, I never wait for such a dragging out as this, where hours have been wasted and the strength of the patient frittered away. So soon in the second stage as uterine forces are not propelling the fetus outwardly with a sufficient degree of rapidity to approach what is considered normal, pituitary extract may be given. The element that has caused most of the erroneous impressions of

pituitrin is the fact that it is put up in ampoules. This appeals to the average man as the dose. Just why an ampoule should be considered the proper dose I cannot understand. I, for instance, use the Parke Davis preparation because I find it a much weaker preparation than the Burroughs Wellcome. One ampoule of the Burroughs Wellcome is a powerful drug, whereas one of the Parke Davis's preparation is also a powerful drug, but not so effective. Why should an ampoule be considered a proper dose any more than a tablet of one-fourth of morphine and one-hundredth of atropine? If the drug had been put up in bulk, and each of us had found the effect of a certain number of minims, then we could comprehend results.

I have found in my experience that a third of an ampoule of Parke Davis preparation is all that is necessary if the drug is applied in the manner in which I use it and for the purpose for which I use it. The effect is evanescent and the dose is repeated every half hour as long as is necessary.

Please let it not be thought that because I begin this paper with reference to the second stage, that the second stage represents the point at which pituitary extract should be given. In my mind there is no dictum that pituitary extract should not be used, because the second stage has not been reached. If the first stage progresses too slowly, with membranes unruptured, cervix not dilating with sufficient degree of rapidity, pituitary extract may well be given for the purpose to which I have referred, namely to stimulate the uterus to do the same degree of work that is done in the normally progressive case. I have had more than one argument with men, and very able men too, who say "Very well, use pituitary extract if you think it is indicated in the second stage, but," and here they hold their hands up in holy horror, "never use it, and certainly never advise its use, in the first stage."

I wish that someone would put forward any physiological reason, any reason based on experience, any reason based on fear, any reason based on practice, that contraindicates the use of a drug which makes the first stage of a subnormal patient behave like the first stage of an absolutely normal patient. If I were asked in what cases pituitary extract evidences its greatest value in labor, I would be almost prompted to include those cases where the head of the fetus is well molded and through the brim where we find on examination, after labor pains have begun, that the head is down in the mid-plane, yet the cervix is not at all dilated. These patients go on sometimes for hours and hours having pain so severe

that they make sharp outcries, and yet the cervix scarcely dilates, there is no show, there is no rupture of the membranes.

In these cases some of the most remarkable results occur. Hypodermatic injections of one-third of an ampoule of pituitary extract will cause a sudden and rapid increase in the severity of the pains, there is an immediate show, and within a very short time the cervix is dilated and the cleft begins to show in the vulva. the anus dilates, and we know that the head is on the perineum.

How any one can find a contraindication to the use of pituitary extract in cases where the head is well molded in the brim, or through the brim, where the membranes are unruptured, but the cervix does not dilate, is something that I do not understand. If there be any danger of rupturing the uterus through the use of pituitary extract, it certainly does not hold good when membranes are unruptured, when the liquor amnii is present. It certainly does not hold good when small doses have been given. The effect of these small doses is sufficient to bring on these pains which are ordinarily expected. The effect, however, lasts only a short time, therefore more reason to repeat the drug in small divided doses.

Dry labor represents the type of case in which one is very much disinclined to proceed with pituitary extract, except in the most cautious manner. But I have had several such cases. Dry labor naturally being a slow process, may mean a long tedious time for the patient in the first stage, possibly a long tedious time in the second. We are concerned here, however, with the first stage.

Now, with the indications that I have mentioned fulfilled, and the cervix dilating slowly and the patient having pains, but progress being much more slow than one has the right to expect, pituitary extract in the doses mentioned, produces nothing less than satisfaction. In fact, I fail to see where there is any danger in the administration of this drug, if by its use we produce contractions no more severe than normal pains. In fact, we do not give this drug to a normal case to make the pains effective or to bring on the labor more quickly. We give it in the subnormal cases where the propulsive powers are below par, where progress is not being made, where the patient suffers but gets no reward for her suffering.

If pituitary extract makes these pains actually progressive affairs, giving them the same power and the same tone that we find in a normal case, what possible harm can there be?

Who is it that claims that in every case nature supplies to that

particular patient the decidedly requisite stimulus for acting upon the uterus? If that were so, all patients with normal conditions would be finished within the same length of time. The variations are great within the normal limit, and are still more marked within the limits that we call deviations up to the stage of uterine atony.

In the pregnant woman, unless she is in labor, pituitary extract has absolutely no effect whatsoever in bringing on rhythmical labor pains.

This fact suggested the use of pituitary extract by the hypodermic needle as a diagnostic procedure, in other words, patients often, at or about the expected time or even a month before, have what are known as suggestive pains. Very often these are only what the text-books call "false pains."

The obstetrician is in doubt as to whether the patient is going into labor. These pains may come, last for a few minutes or an hour or two, and then stop for a day or a week, come on again, and in that way keep the physician on the anxious seat. Knowing the effect of pituitary extract when the patient is in labor, I adopted the use of this drug in those cases where we were in doubt, with the idea of determining whether the patient's pains were real or false, and to my agreeable surprise it has proven to be of the greatest value in several instances. I may say that if the patient have pains of this indefinite sort, and a third of an ampoule of pituitary extract be given by needle, and if in another half hour another third of an ampoule be given by needle, and if in another half hour another third of an ampoule be given, and then no regular rhythmic pains come on, the patient is not in labor.

On the other hand, one is surprised to find how often this treatment brings on regular rhythmic labor pains, and the patient goes on through her labor as she would have done under ordinary circumstances, even if no preliminary pains of lesser or greater character had taken place.

Let me instance the case of a patient who went a week over her expected labor period. She had had, on two occasions, pains every ten or fifteen minutes lasting for an hour or two. These pains would then cease.

I determined on the occurrence of the next so-called irregular pains, to try the use of pituitary extract. When the pains came on every ten or fifteen minutes, the nurse notified me, and when I reached the house after the lapse of an hour and a half all these pains had stopped. I then administered a third of an ampoule of pituitary extract, in half an hour I gave another third, in another

half hour another third. The patient went on into regular labor and in six hours was, under chloroform, delivered. This was a primipara.

Another patient, who had had one child, was warned by me to inform me of the first pains she had or of any flow of liquor amnii, or of any sign of blood. She notified me at seven-thirty in the evening that in the toilet she had noticed a slight stain of blood. I immediately went to the house and found the patient fully dressed ready to go out. I said "I shall try and see if you are in labor or not." I gave her a third of an ampoule of pituitary extract and in ten minutes the pains came on regularly. She was undressed and put to bed, in half an hour she received a second ampoule, in a half hour a third of an ampoule. Less than two hours after I entered the house her baby was born.

The induction of labor furnishes us with another indication for the use of pituitrin.

After the bag is introduced, just as soon as discomfort and suggestive or actual pains begin, the repeated injection of pituitary extract often brings on or produces more marked labor pains.

By this means we are able to bring on the labor more readily and more quickly and avoid the introduction of additional bags of different sizes.

We know that often after a bag has been introduced, only discomfort results, yet gradually the cervix dilates, not infrequently without any actually definite pains.

We first know that dilatation has occurred when the bag is expelled. If no second bag be introduced, the cervix not infrequently returns to its normal size, and we have not advanced one step further in the induction of labor.

Hence, as I said before, while the bag is in place, even while the patient is experiencing only indefinite discomfort, but more definitely where there are actual pains, if small doses of pituitary extract be given in successive doses, at intervals of twenty minutes to a half hour, a progressive labor will ensue in a very much shorter space of time.

Let me mention the case of a primigravida, whose labor I believed would be a rather tedious one. The patient was very obese, extremely neurotic, the pelvis was not any too large, the fetus seemed to be fairly large, the head was not firmly engaged in the brim. The cervix was very soft and labor had been awaited for many days. The patient was given a dose of castor oil which was followed after a short time by several doses of quinine.

Then, on the occurrence of slight discomfort in the pelvis, three hypodermics of a third of an ampoule of pituitrin were administered. There seemed to be some pain which soon ceased and nothing further was done (molding was noted). The next morning the same procedure was carried out. More castor oil was given followed by 30 grains of quinine. Then a third of an ampoule of pituitary extract was given, and slight pains began to come on, another third of an ampoule was given at the end of the half hour, a third of an ampoule was given at the end of another half hour.

At the end of each of these intervals, the pains would seem to die down. Examination showed progressive molding of the head, but no evidence of dilatation of the cervix.

I was determined to carry this patient on to a complete delivery if possible and she received a third to one-half of an ampoule of pituitrin practically every half hour from that time on. I may say that it is my belief that otherwise this patient would never have been delivered without the use of forceps, as her pains were severe but not effectual. Reasons for thinking so—a large head, a long rigid vagina, very rigid perineum, absolutely no propulsive power in the uterus without pituitrin. This patient received between the morning when discomfort began after the first administration of castor oil and quinine, and the evening when labor was completed, in doses of one-third to one-half of an ampoule, twelve to fourteen full ampoules of pituitary extract.

The labor was carried to a successful conclusion without any injury to her or to the infant.

Chloroform was administered in the latter stages and she was totally unaware that her baby had arrived. My experience is that in these cases where the labor pains are exceedingly much felt, where the patient makes loud outcries, the administration of an eighth of morphine and one hundred and fiftieth of atropine or scopolamine, often relieves the pain but stops the uterine contractions for varying periods. It does not greatly relieve the severity of the pain, it diminishes the frequency and forcefulness of the pain when pituitrin has been given.

The action of these drugs in interfering with the specific action of pituitrin, was one of the important reasons for my taking a stand against "twilight sleep" from the very first. The same holds good with chloroform. Just so soon as chloroform is administered, the power of the pains, their frequency and regularity diminish, and in some cases cease, when the patient is under. Hence, just so soon as chloroform is begun, one is compelled to increase the frequency

with which pituitary extract is given. Then one must not forget that a cumulative effect may result, and one may get an extremely rapid and forceful contraction of the uterus with a too rapid delivery of the head.

My usual procedure with chloroform is to wait until the head is on the perineum. The idea is to further delivery, without too active propulsive efforts on the part of the patient, and without her experiencing the exquisite pain.

A few drops of chloroform are put on the mask and held over the patient's face. This is done just on the recurrence of each pain. So soon as the talking and tossing stage has passed, the patient may be kept more or less quiet by these few drops of chloroform administered at the time of the pains. If necessary, a few drops are given between the labor pains.

The immediate effect of the administration of chloroform, is to diminish the frequency of the pains and their forcefulness, hence it is customary, after an interval of a few minutes, to give another third of an ampoule of pituitary extract. Then, not infrequently, the pains begin to come with force, the patient evidencing a certain amount of abdominal pressure with each pain, and additional chloroform must be given.

When the head has appeared beyond the vulva and there is no longer recession between pains, chloroform is given a little more generously so that the patient's abdominal muscles do not act by reflex.

If a period of quiet sets in at any time, and the head of the fetus does not advance, a third of an ampoule of pituitrin may be given. One must remember the cumulative effect of the two or three doses, as contraction on the part of the uterus, results which nothing can stop, especially if the patient comes out enough to use voluntary pressure. One hand must remain on the perineum, protecting it from injury by the shoulders, and the other hand, by traction, brings the anterior shoulder under the symphysis. Then the posterior shoulder makes its exit over the perineum without injury to that tissue.

Postpartum hemorrhage has never been my lot.

In the cases in which I have given pituitrin, I do not depend upon the pituitrin for any other purpose than to aid in the expulsion of the embryo.

Just as soon as the fetus is born, and while I am tying the cord, the nurse gives to the patient one teaspoonful of ergotole in a little water. This is followed in half an hour by a dose of one-half

of a teaspoonful of ergotole in a little water. I would far rather rely upon ergotole for contractions of the uterus, also for aid in the expression of the placenta. I never wait a half hour for the placenta to be expelled. About five minutes after giving the ergotole, I expel the placenta by the Crèdè method.

I have never experienced anything simulating in the slightest degree, a postpartum hemorrhage. That a hemorrhage may follow after the administration of pituitary extract is no criticism of the drug. The drug, after all, does nothing except to increase the rhythmic contraction of the uterus. It does not produce a steady, permanent contraction. In the intervals between the contractions, where a state of relaxation has come on, a separation of the placenta, or an atony of the uterus may come on followed by postpartum hemorrhage, just the same as in those cases where no pituitary extract has been given. It certainly has not struck me that the administration of pituitary extract during labor diminishes to any extent the ability of the uterus to contract perfectly upon proper stimulation. I always give ergotole. I have heard various men express their fear of a rupture of the uterus through the use of pituitary extract. They mention this or that case in which such accident occurred. But it is needless to say that a man who uses pituitary extract when the uterus contains a fetus malrelated to the pelvis in size or position, is not playing safe.

The advisability of testing progress in proper cases depends on small doses. It is perfectly natural that a rupture of the uterus should result with large doses where there are malrelations and malpositions.

These facts only prove that the drug in proper hands, properly managed, is of the greatest value. One may say of any drug in the pharmacopeia that with too large doses or improper indications, harm is bound to result. I cannot extol too greatly the valuable effect of pituitary extract in Cesarean section. If a hypodermic of this drug be given just before the abdominal incision is made, it is remarkable what a great degree of contraction one obtains in the uterus after the incision is made and after the fetus membranes and the placenta have been extracted. The uterus contracts decidely, the lining of the uterus bleeds very little if at all, while the wound surfaces of the uterus are expected to show no bleeding whatsoever.

If the sutures are put in quickly, we have no bleeding from the lining of the uterus entering the field of operation. Contraction of the uterus may be so marked that even if the incision be a fairly

generous one, it is not always easy to extract the fetus from the contracted uterus.

After a Cesarean section has been done, it is my habit to give a half an ampoule by needle in the morning, and another half ampoule by needle in the afternoon for several days. I presume that this aids in keeping the uterus contracted. It relieves the uterus from that relaxation which puts a constant tension on the sutures, and promotes an early restoration to the normal. Very often, in curetting an incomplete abortion, I find a period of profuse bleeding. I then administer an ampoule of pituitary extract. After a few minutes scraping with the curette, I gradually get the hard sensation of the contracting uterus, and eventually I get the uterus down more and more to the normal, so that the curette goes in only a little further than the average distance. I do not find that pituitary extract aids very much in bringing about this contraction of the uterus. I think that the older method of giving ergotole by needle, of giving a hot intrauterine douche during the curettage, or of simply waiting for the uterus itself to contract, give about the same results. My conclusion is that even in incomplete abortion, pituitary extract has not a specific, rapid action.

In properly chosen cases of menorrhagia or metrorrhagia the administration of pituitary extract is followed by excellent results. Just how much is due to action on the uterus through stimulation, just how much is due to its action on the ovaries through a diminution of their activity with possible atrophy, cannot be definitely decided. However, one thing is certain and that is, that pituitary extract given by hypo is certainly more effectual in those cases where curettage has first been performed. I have in a large number of instances, curetted patients and then, while they were in bed, have had them receive every day, hypodermic injections of pituitary extract and have given in addition large doses of ergotole. I have continued this treatment for a period of three, four to six weeks, and in no case not due to a tumor, have I failed to procure a marked diminution in the monthly flow, and in some cases an absolute cessation of the same. I have the feeling that in causing this diminution of the action of the ovaries, we are accomplishing a preliminary and early development of the menopause, a thing much to be desired in those cases where children are no longer expected.

After the Dührrsen operation it not infrequently happens that menstruation is atypical. It lasts longer, or else the menstrual flow is much more profuse, or else after a menstrual flow of several

days there comes an interval followed by another menstrual flow of a shorter period of time. In these cases the repeated continued injections of pituitary extract is followed by return to the normal, almost without exception as far as my recollection goes. Pituitary extract is an excellent drug to administer after an operation in those cases where the patient does not react well, either to the anesthetic or to the operation itself. I do not refer here to shock due to internal or concealed hemorrhage. I simply refer to those cases where a little stimulation of a general nature is of benefit. In this class of cases, pituitary extract acts very well.

In postoperative cases where intestinal passages are brought on with difficulty, where one fears possibly an intestinal paresis, possibly as adhesion of any sort, and one is anxious to get an evacuation of the intestines, pituitary extract given by needle as occasion demands is a very, very excellent thing, one of the best at our disposal. It has in my hands totally displaced eserine salicylate.

Where the bladder function is below the normal and the muscle power is not there, where the patient cannot empty the bladder, as after an operation or postpartum, hypodermatic injections of pituitary extract are said to be very frequently effective. However, the catheter is always at our disposal and offers a sure method of relief. Hence, I believe in this type of cases the indication is not very extreme. In those cases in which the bladder atony is marked and of a chronic nerve form and nothing seems to relieve the condition, this drug will be found of the greatest benefit if continued long enough.

In using this drug over a long period of time for the treatment of postpartum hemorrhage and for other cases, I have observed that individuals react differently to the drug, so far as intestinal tone is concerned. Some of the patients ask: "Doctor, is there anything in the hypodermics that acts on my intestines, for it has a very good effect on my constipation, in fact I can scarcely wait until I get home after leaving your office?"

Other patients showed no effect of the kind whatsoever, which has led me to believe that perhaps by the use of pituitary extract, as well as by the use of other drugs, we might be able to test for that secretion which is lacking in the economy of a patient suffering from habitual constipation or other anomalies.

In none of the cases in which I have administered this drug, whether in primigravidæ or multigravidæ, in nonpregnant cases, cases of abortion, Cesarean section cases, etc., have I found a contraindication or noted any injury from the medical standpoint.

I can readily imagine that with high pulse tension, with an arterio-sclerotic condition, or with some other anomaly in the circulation, there might be an indication not to use the drug, but that type of case, as a rule, rarely comes under the headings mentioned in this paper. I have a feeling that certain cases of eclampsia may contra-indicate the use of the drug.

If there is a probability that Cesarean section may be required, pituitary extract may be used to furnish the so-called "test of labor."

Personally, I am for Cesarean section every time as against high forceps with the head not molded and not firmly engaged. An all-important factor is that we must be sure that the head can pass through the brim of the pelvis.

Pituitrin is very much the same as gasoline and speeds to an automobile. The use of pituitrin is not to be looked upon as indicated by special or urgent considerations only.

Pituitary extract does not act in the same degree in all patients. A small dose in one case may be very effectual, seeming to start the machinery on a steady run, the drug having a stimulating effect on the patient's pituitary or other gland secretions. In most cases, numerous repeated doses are necessary; the effect is evanescent, lasting only a half hour and seeming to take the place of a lack of a proper amount of the normally produced pituitary secretion.

The average duration of labor in primigravidæ is six to seven hours if pituitary extract is used.

In multigravidæ, the duration is from fifteen minutes to two hours after the administration of pituitary extract. It is a most risky thing to leave a patient's bedside when pituitary extract has been administered to a multigravida. The term "atony" does not mean the uterine muscle may not do its work; we select a period when it does not, and call it uterine atony. Practically all men are against its use in the first stage. I assert that in this stage, under proper conditions, it is of the greatest aid in furthering the progress of labor. With these conditions not present, it may be used with great care for diagnostic or test purposes. These preliminaries do not obtain as necessities; I believe that the use of pituitrin following the preliminary adminsitration of castor oil, etc., will enable us, in a large proportion of cases, to bring on labor at the-full-term period, and thus do away with the bag or metreurynter method, except where haste is indicated.

DISCUSSION.

Dr. R. R. Huggins, Pittsburgh, Pa.—While it is inspiring to hear a strong-minded man debate a subject the unfortunate part about it is that the general practitioner who does most of this work does not always catch the contraindications set forth in the paper. I agree with Dr. Bandler that pituitrin is a wonderful drug and that it helps us out of a great many difficulties especially those following operation.

A few weeks ago a very capable practitioner sent a patient into the hospital. So far as he could determine the pelvic measurements were normal. The os was fully dilated, and the head was in the pelvis. He gave her one hypodermic of pituitrin and within twenty minutes she was in a state of extreme shock. When I opened the abdomen two hours later there was a complete supravaginal amputation of the uterus, the child was in the peritoneal cavity and the only things left to do were to remove the child, stop the hemorrhage and close the abdomen.

Dr. Charles E. Ziegler, Pittsburgh, Pa.—My experience with pituitrin has not been quite so rosy as that of Dr. Bandler. I think he has made a valuable contribution to the subject in warning against the use of large doses. In the vast majority of my cases, where I have used small doses, I have gotten results similar to those he has described. Occasionally I find a case where there seems to be some idiosyncrasy against pituitrin. I have gotten tonic contraction of the uterus, the heart sounds have gone bad, and I have been compelled to deliver rapidly whether the conditions were favorable or not. I never give pituitrin, therefore, unless the case is so far advanced in labor that I can deliver at once if necessity for it arises. By following the fetal heart sounds carefully, especially near the close of the second stage of labor, I find occasionally they become bad after the administration of pituitrin. This is only in the exceptional cases, however. I recall one case in a primipara where the head was almost on the pelvic floor, and the pains gave out. I gave ½ c.c. of Parke Davis and Company's preparation and we had a tonic contraction of the uterus. The heart sounds fell to 80 and became irregular. The contraction of the uterus was severe and continuous; the head was pushed over the perineum, the baby was severely asphyxiated, and I had a hard time to save its life. I find that pituitrin is much like ergot in many ways; it should never be used when the head is above the inlet in a multipara even. In the hands of a man who is not a competent obstetrician, the use of pituitrin is of uncertain value. Faulty positions of the head are frequently equivalent to marked pelvic insufficiency. Pituitrin should not be used, therefore, until the head is well down in the pelvis and dilation so far advanced that delivery of a living baby may be readily accomplished should interference become necessary. Pituitrin is most valuable during the puerperium and is indicated in every case of operative delivery or where one has reason to fear infection. I give pituitrin regularly, in such cases, ½ c.c., night and morning for a week if well borne. Firm uterine contractions

are maintained, the uterine sinuses are closed and the spread of infection less likely to take place. I have had two cases in women who had active gonorrhea in which by giving pituitrin for ten days daily and regularly I avoided extension of the infection into the uterus. One woman has been delivered twice since, her tubes are patulous and in good condition.

Pituitrin is effective in cases of retention of urine in about 60 per cent. of the cases only, but when it works, it works beautifully.

Dr. Sylvester J. Goodman, Columbus, Ohio.—In 1911, when they were doing early work with pituitrin in Vienna, I had the good fortune to be there. My idea in going to Vienna was to get the fine points in connection with forceps delivery. However, when I got there I found they were using pituitrin and were doing away with forceps. When I returned to Vienna two years later they were using pituitrin more than ever and were greatly impressed with the markedly decreased morbidity in obstetric cases.

One of the gentlemen spoke of sending out students with a pair of forceps and saying, "Go thou and do likewise." I should say, if he gave them a few tubes of pituitrin when he sent them out the morbidity would be greatly reduced. I believe pelvimetry and the use of pituitrin go together, as the doctor has just said. Pituitrin in the hands of the practitioner who does not know how to use a pelvimeter is a dangerous thing, because in cases of contracted pelvis he may use the pituitrin and have a great mortality and morbidity. In emptying the uterus after abortion, pituitrin has proved valuable to me. As Dr. Findley said, in emptying the uterus we are afraid of perforating it; we are never sure we have it clean. If after dilating the cervix, a good dose of pituitrin is given, the uterus will empty itself, the fundus will come down, and it gives you a great sense of security in putting the curet against the fundus of the uterus. We have used this extensively at our hospital and very successfully.

The great danger of giving large doses has been brought out, but it should be impressed that even though we may not have rupture of the uterus, and I have never seen pituitrin cause rupture of the uterus, after-pains are severe, when too large doses of pituitrin have been given. This is quite important.

One of the conditions in which pituitrin has been valuable in my experience is what was pronounced by one of our internists a case of status lymphaticus. It was a condition resembling shock following delivery in which, without hemorrhage, the woman seemed to float away, or pass away from us without any reason, and one or two doses of pituitrin brought her back, helped the heart action, and so far as we could tell saved her life.

The point I desire to bring out in a few words is that pelvimetry and the use of pituitrin go together.

Dr. Henry Schwarz, St. Louis, Missouri.—Dr. Bandler's experience about covers my own practice. In 1913 I got one of my associates, Dr. Newell, to try four different preparations of the

pituitary gland in 100 cases. We used it first in doses of 1 c.c. At that time we tried it only when there was complete dilatation so as to be ready to interfere without loss of time. In quite a number of cases we got stormy contractions, which we found now and then when there was a mechanical disproportion between the pelvis and the fetal head, where we had to interfere with morphin injections to re-establish equilibrium of placental respiration, so that Dr. Newell reduced the dose, and we used only 5 minims to each dose. Then we no longer got the stormy contractions, and as we went along we felt safe to use the preparation in the early stages of labor and found no reason to change that. We likewise found we could never induce labor with the pituitary preparations except when the women were near term and when they presumably already had pains, although they were not fully aware of that fact. After introducing a bougie (we did not use bags), after we had slight contractions, then we could by the use of pituitary preparations study the contractions. We find, however, that for the induction of labor, when the woman is at or near term, if we give an ounce of castor-oil and instruct the nurse to massage the uterus, and then give 5 minims of a potent preparation of the pituitary gland, we can in most instances induce labor promptly and safely. We find a difference as stated by the doctor in pituitrin. The pituitrin preparation of Parke Davis and Company is only half as potent as that of Burroughs and Welcome and of Armour and Company. We have used four preparations, namely, Armour's, Parke Davis and Company's pituitrin, we have used a German preparation called hypophysin, and we have used Burroughs and Welcomes' preparation. We are using Armour's and Burroughs and Welcomes' preparations extensively, although the others are good. With 5 minims we get beautiful results. If the injections are given intramuscularly I get a very prompt effect.

I do not quite agree with Dr. Bandler as to the use of ergotol or any other preparation of ergot before the placenta is removed. The pituitary preparations surely assist us in the safe conduct of the third stage of labor. I consider the administration of a potent preparation of ergot before the placenta is delivered as a dangerous practice. There may sometimes be retained placenta, and there may be a spasm of the cervix which will make the manual removal of such a placenta a disagreeable job.

Dr. Bandler (closing the discussion).—I am afraid I will take more than the five minutes allotted me in closing this discussion. I used pituitrin in a case in order to attend this meeting. I had a patient whom I could not leave. I expected her to be confined Tuesday or Wednesday, and I wanted to attend this meeting. Monday morning I gave her castor-oil and quinin, and I found what I have found in several cases, that molding was going on. I gave castor-oil and quinin again the next day and stayed at her bedside myself. I delivered her with the aid of pituitrin in the afternoon.

With reference to the action of pituitrin on the bladder, I have

a patient whom I confined a week ago. She had a large amount of distention of the abdomen, with inability on part of the bladder to act. Pituitrin has a much better action on the intestines than on the bladder. I have used it in postoperative gynecological cases time and again, and if a patient needs stimulation after operation, where I formerly gave caffein, camphor, whiskey, etc., I now give pituitrin. If I have to deal with a case that needs any stimulation, I give pituitary extract also. In this particular case I gave it for that purpose, and still the patient had to be catheterized. I have not found that pituitrin acts specifically on the bladder.

The cases I have reported were all private cases. No assistants gave the drugs. From the time pituitrin is first administered, and the nurse tells me how things are going, until the baby is born, I am there on the case. They are not ward cases, but cases that are under my personal observation. I used one ampule of pituitrin in my first case on a doctor's wife, and the doctor and I stood by astonished at the powerful contraction of the uterus. He was very much frightened. I have never given as a dose over one-half ampule since to any patient in labor. Then I went down from one-half to one-third, and now a third is my standard usual dose, but I modify it more or less as you would any drug. The indications for the use of pituitrin I have clearly set forth in my paper. The doctors in my city use pituitrin but they give a full ampule as a dose and get into trouble. If they give a full ampule when there is dystocia they are likely to rupture the uterus. When the head is well molded in and through the brim, one need never give more than one-third of an ampule of pituitrin, and by so doing we are going to save more lives and they are going to lose fewer.

As to the fetal heart sounds, I cannot say that there is no difference on the use of pituitrin. If you listen to the heart sounds of a baby after any uterine contraction, you will find considerable modification, and if you are watching the heart sounds in a dozen normal cases, you are surprised how often the baby's heart seems to be acting badly. If the same thing happens with pituitary extract you might consider it abnormal. The heart sounds are no more altered after pituitrin has been given than without it. A normal uterine pain causes a modification in the child's circulation and in the placental circulation whether you give pituitrin or not. I do not think that is an objection. I have never had one baby that was born blue. If we could deliver all patients in hospitals it would be ideal. I hope some day I will be able to deliver all primiparæ in a hospital. If we were to say to these women, "I will not take you unless you go to a hospital or a sanitarium," it would do more for obstetrics than any other one thing we could decide on to-day.

The average doctor in New York does not hesitate to put on forceps with the head in the mid and low plane, and the way he tears the perineum is terrible. If we can teach him to avoid forceps, we are doing something. If you are in a hospital or private sanatarium and deliver a patient there and forceps are necessary, what a joy it is to be able to wash your hands while the anesthetic is being

given. The assistants are there; you can take an hour, if necessary, to bring about delivery, and some one can listen to the heart sounds while you are pulling on the head. If you use forceps in the best of private houses you have got to have a table and leg holders; you have got to watch the nurse and see that everything is thoroughly and properly boiled. I would rather do a laparotomy for appendicitis in a private case than a forceps delivery. One case is infected already and the other may be.

Multiparæ will drive you mad. I do not gladly take multipara cases anymore. They nag and nag you and say they have a little pain here and a little pain there and one is in doubt as to the meaning of these pains. The very minute they complain of pain I now give them pituitrin. I do not care whether the head is molded or not. I had this experience with a multipara who was in labor for a considerable time. There was no dilatation of the cervix or fixation of the head. It seemed as if something had to be done. I tested her with pituitrin. Almost before we knew it the head was on the perineum and the child was born in ten minutes after pituitrin was given. As I have said, the head was not fixed, was not molded and the cervix was not dilated. You dare not leave a multiparous patient once you give pituitrin as you do not know what is going to happen. I have not, since I began using this drug, spent more than two hours in the house of any multiparous patient. I find it is unnecessary.

With reference to choosing between pituitrin and ergotol, I use pituitrin in Cesarean section cases just before the abdominal cut is made. Every case of Cesarean section is then given half an ampule in the morning, and half an ampule in the afternoon, and this is kept up for days. In my obstetric work instead of giving pituitrin every morning and afternoon, I give half a dram of ergotol every three hours for days and days, sometimes for three, five or even eight weeks. It aids the uterus in its involution. You avoid the danger of infection by using ergotol. I use ergotol in this way in preference to pituitrin because I find it causes tonic contraction that stays there, whereas pituitrin contracts the uterus and also relaxes it.

MENSTRUAL STATISTICS; A STUDY BASED ON 4500 MENSTRUAL HISTORIES.

BY

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As material for the compilation of these statistics, the writer used somewhat over 4500 records of his office patients; utilizing the menstrual features common to the patients in their normal health and disregarding those that were modified by illness. To test the reliability of the information obtained in the records the writer, wherever the opportunity offered, took the menstrual histories a second time, carefully directing the questions so as to bring out accurate information. While the histories taken the second time did not in the main differ from those taken the first time, yet they disagreed in some details, especially in those concerning the menstrual intervals. Thus menstrual periods varying two to three days in different months were called by some regular and by others irregular. Even when the definite number of interval days was given, the second histories revealed in some cases an irregularity of two to three days.

The discoveries of the errors of the first histories were most frequently obtained by direct questions in the following manner: twenty-eight- or twenty-one-day interval cases were asked whether they always menstruated on the same week day. One-month interval cases were asked whether they always menstruated the same day of the month. Cases that gave in the first history a definite number of interval days, say twenty-seven days, were asked if they menstruated the first day of the month, would they expect to menstruate the twenty-eighth of the same month. The answers showed that many patients, especially the unmarried ones, did not keep track of their menstrual intervals, and many of those that did, admitted the inaccuracy of their first information.

Could all the histories be retaken in this careful manner, the data concerning the menstrual interval would be more reliable. Unfortunately, such a procedure was impossible and this impossibility

must of necessity constitute a weak point of our "interval" statistics. Another difficulty in exact compilation of menstrual statistics lies in the fact that menstrual features in many women change with the advance of menstrual life. The normal menstrual periods given in records usually present menstrual features which the patient considers characteristic in her normal health at the time of examination. But these features may be altogether different in her early or later life, and therefore, statistics based on information thus obtained cannot be as accurate as those obtained from people advanced in life, whose complete history, early and late, can be accurately traced.

Fully aware of these deficiencies, we tried to make the best of the records on hand, and we present here the statistics based on over 4500 records, covering the menstrual interval, the age of onset onset of menstruation, the quantity of flow, the menstrual clots, the dysmenorrhea, the last menstrual period, and other features which in our judgment might be of interest to you.

Menstrual Interval.—4682 cases gave the histories of their menstrual intervals and of them 1053, or 22.5 per cent., were of an irregular type; 3629, or 77.5 per cent., were of a regular type.

IRREGULAR TYPE OF MENSTRUATION.

As seen from the above, 22.5 per cent. of the total number studied gave an irregular type of menstrual interval. In other words, less than one in four menstruated irregularly. To show the character of this irregularity, Table I was compiled.

TABLE I

		Per cent.
"Irregular"	111	.....
3–4 weeks	69	7.31
4–5 weeks	49	5.19
2–3 weeks	33	3.51
5–6 weeks	23	2.44
4–6 weeks	18	1.9
1–2 months	17	1.8
6–7 weeks	16	1.69
24–28 days	14	1.48
2–4 weeks	12	1.27
21–24 days	12	1.27
2–3 months	11	1.16
3–5 weeks	10	1.06
25–28 days	9	0.95
4–7 weeks	9	0.95
1–3 months	8	0.84

3–4 months	8	0.84
28–32 days	7	0.75
Miscellaneous*	616	65.0
Total	1052	

We see in this table that 941 patients defined the nature of their irregularity. Arranging them in groups based on the approximate number of their interval days, and placing these groups in order of their frequency, we find that the most common irregular type of interval is that of 3 to 4 weeks (7.31 per cent.), next 4 to 5 weeks (5.19 per cent.), then 2 to 3 weeks (3.51 per cent.), 5 to 6 weeks (2.44 per cent.), 4 to 6 weeks (1.9 per cent.), 1 to 2 months (1.8 per cent.), etc.

REGULAR TYPE OF MENSTRUATION.

Three thousand, six hundred and twenty-nine patients, or 77.5 per cent. of the total number studied, gave a regular menstrual history. In other words, three out of every four women menstruated regularly. Of this number, 2562 specified the number of the days of their menstrual intervals. We classified them accordingly and arranged the interval types in Table II in order of their frequency.

At the end of this table we find eight types that are somewhat irregular, their irregularity varying from one to two days. They represent the number of patients who, upon a second investigation of their menstrual histories, admitted an irregularity in the menstrual intervals, which in their previous histories were given as regular. These were placed among the regular type, because patients usually ignore such slight variations and consider such intervals regular.

Glancing over Table II we see that the 28-day type leads in numbers. It constitutes 72.01 per cent. of the regular type and 50.5 per cent. of the total number of patients studied. The 30-day type follows with 3.77 per cent., then the 24-day type with 3.33 per cent., then the 27- to 29-day type with 2.46 per cent., the 26- to 28-day type with 2.34 per cent, the 27- to 28-day type with 2.34 per cent., etc.

The number of patients giving their menstrual type as that of one month was sixteen and that of thirty-one days, eighteen. On

* This group represents many irregular interval types with a small number in each, none of them exceeding four patients. A few such types may be cited here: 3 to 7 months, one; 3 to 9 months, one; 5 to 10 months, four; 9 to 11 months, one; 20 to 35 days, one.

TABLE II.

		Per cent
"Regular"	1053	.....
28 days	1835	72.01
30 days	97	3.77
3 weeks	86	3.33
25 days	31	1.2
26 days	30	1.16
5 weeks	27	1.04
2 weeks	21	0.81
24 days	19	0.74
31 days	18	0.74
1 month	16	0.62
27 days	15	0.58
23 days	13	0.5
6 weeks	9	0.35
2 months	6	0.23
34 days	5	0.19
3 months	4	0.15
6 months	3	0.11
5 months	2	0.07
22 days	2	0.07
32 days	1	0.03
2½ months	1	0.03
18 days	1	0.03
28–29 days	40	1.57
28–30 days	43	1.67
26–28 days	61	2.34
27–28 days	61	2.34
27–29 days	63	2.46
26–27 days	30	1.17
24–25 days	8	0.31
24–26 days	14	0.54
Total	3615	

second investigation of their menstrual histories seven of them gave exact monthly dates of the menstrual periods independent of the number of days in the month; two the first of the month; one the fifth; one the nineteenth; one the twenty-sixth; another the twenty-seventh, and again another one the sixteenth. One of them, a married patient, not only menstruates the first of every month, but claimed to have re-established her periods after her two child-births, on the same date.

TEMPORARY IRREGULARITIES.

A great many of the regular patients stated on second inquiry that while, as a rule, they menstruated exactly on date, they occasionally

came a day or two later and again one or two earlier. This slight irregularity they sometimes ascribe to physical or mental disturbances of some sort. Such patients consider themselves perfectly regular. Again, patients who remember their past menstrual history will record a periodic irregularity at different times of their past life. This is especially noticed during their early menstruation when the intervals may have been either longer or shorter. This irregularity lasting for some time frequently becomes regular with the advance of menstrual life. Seventy-nine such cases gave such observation in their history, twenty-nine observed these changes while still single, forty-seven after their marriage and before childbirth, and three after childbirth.

Occasionally in the early menstrual life of our patients we met an amenorrhea lasting for a considerable time. Thus one patient missed a year after 6 months regular menstruation, another missed 3 to 5 years after 2 years of regular menstruation, one missed 3 years after 4 years of regular menstruation. Most frequently, however, the irregularity was noticed in the second menstrual period.

We collected 163 cases that showed a temporary amenorrhea after the first period. In order of their frequency they are as follows:

TABLE III.

		Per cent.
12 months	64	39.3
6 months	25	15.3
2 months	14	8.6
3 months	11	6.7
2 years	11	6.7
4 months	10	6.1
5 months	10	6.1
8 months	6	3.6
9 months	5	3.0
7 months	3	2.0
4 years*	1	
1 week later	1	
3 weeks	1	3.0
14 months	1	
Few months later	1	
Total	164	

* Menstruated at thirteen after a fall and then the second time not before seventeen.

AGE OF ONSET OF MENSTRUATION.

The number of patients giving the age of onset of menstrual flow was 2864. The patients of the regular and irregular menstrual types were separately classified in Table IV, according to the different ages of the onset, giving the percentages of each year separately for the regular and irregular types and for the total number of patients studied.

TABLE IV.

Menstrual types	Regular		Irregular		Total No. of patients	
No. of patients	2280	Per cent.	584	Per cent.	2864	Per cent.
Age of patients						
9 years.....	2	0.08	2	0.34	4	0.13
10 years.....	5	0.21	2	0.34	7	0.24
11 years.....	86	3.77	25	4.28	111	3.91
12 years.....	290	12.71	63	10.78	353	12.32
13 years.....	548	24.03	138	23.63	686	23.95
14 years.....	553	24.29	117	20.03	670	23.39
15 years.....	385	16.88	92	15.75	477	16.65
16 years.....	232	10.17	74	12.67	306	10.68
17 years.....	101	4.42	41	7.02	142	4.99
18 years.....	64	2.807	18	3.08	82	2.86
19 years.....	9	0.39	4	0.68	13	0.45
20 years.....	3	0.13	4	0.68	7	0.24
21 years.....	0	.....	3	0.51	3	0.1
22 years.....	0	.....	1	0.17	1	0.03
23 years.....	1	0.04	0	.....	1	0.03
24 years.....	1	0.04	0	.....	1	0.03

From the above table we find that the most common age of onset was 13 years with 23.9 per cent., then comes 14 with 23.4 per cent., then 15 with 16.65 per cent., then 12 with 12.3 per cent., 16 with 10.68 per cent., 17 with 4.99 per cent., 11 with 3.91 per cent., 18 with 2.86 per cent., 1 per cent. above age of 18.

Comparing the percentages in this table of the regular type with that of the irregular we find very little difference

DURATION OF MENSTRUAL FLOW.

The number of patients that gave the duration of their menstrual periods were 4085. Of these, 3105 belonged to the regular interval type, and 980 to the irregular interval type.

They were classified according to the number of their menstrual days and were arranged in Table V in the order of their frequency.

TABLE V.

Types	Regular		Irregular		Total No. of cases	
No. of cases	3105	Per cent.	980	Per cent.	4085	Per cent.
3 days.....	464	14.84	107	10.9	571	14.2
4–5 days.....	434	13.88	97	9.9	531	13.2
3–4 days.....	357	11.42	94	9.6	451	11.2
5 days.....	236	7.5	85	8.6	321	8.0
7 days.....	220	7.04	93	9.4	313	8.0
4 days.....	242	7.74	63	6.4	305	7.6
5–6 days.....	247	7.9	76	7.7	323	6.1
2–3 days.....	136	4.35	55	5.6	191	5.0
2 days.....	106	3.39	37	3.7	143	3.5
6–7 days.....	103	3.29	32	3.3	135	3.4
6 days.....	80	2.56	24	2.4	104	2.5
8 days.....	46	1.47	18	1.8	64	1.6
7–8 days.....	53	1.69	12	1.2	65	1.6
3–5 days.....	52	1.66	23	2.3	75	1.8
5–7 days.....	47	1.5	18	1.8	65	1.6
4–6 days.....	31	0.99	9	0.91	40	1.0
1 day.....	32	1.02	11	1.12	43	1.1
2–4 days.....	22	0.7	21	2.1	43	1.1
1–2 days.....	24	0.76	10	1.02	34	0.8
3–7 days.....	23	0.73	4	0.4	27	0.6
6–8 days.....	17	0.54	6	0.61	23	0.6
8–9 days.....	16	0.51	4	0.4	20	0.5
4–7 days.....	16	0.51	6	0.61	22	0.5
10 days.....	10	0.32	1	0.1	11	0.3
4–8 days.....	8	0.25	3	0.3	11	0.3
7–10 days.....	7	0.22	4	0.4	11	0.3
1–3 days.....	7	0.22	7	0.71	14	0.4
5–8 days.....	10	0.32	5	0.51	15	0.4
8–10 days.....	13	0.41	5	0.51	18	0.4
Miscellaneous*	46	1.47	50	5.1	96	2.3

As seen from Table V the 3-day duration leads, followed by the 4- to 5-day, 3- to 4-day, 5-day, 7-day, 4-day, etc.

The percentage of the more common duration is given both for regular and irregular types. Comparing them we find that, as a rule, the irregular types have a larger percentage of long durations and a smaller percentage of short durations than the regular types. Thus we find that 70.8 per cent. of patients belonging to the regular type and 67 per cent. to the irregular gave a duration of five days or less, while 29.2 per cent. of the regular and 33 per cent. of the irregular type gave a duration above five days.

* Types of duration with a small number of patients in each.

MENSTRUAL INTERMISSION.

In the study of the duration of menstruation, the writer met with cases of intermission of the menstrual flow. The most common type of intermission was that of one day after the third menstrual day, followed by a day of menstruation. Only in one case was the intermission two days after the third day. In three cases an intermission was found after the fifth day of the flow, two of which showed one day intermission followed by two menstrual days, and one, two days intermission followed by one menstrual day. A number of the cases cited intermission without specifying the time. Most, but not all of these cases, gave a history of only a temporary intermission.

QUANTITY OF MENSTRUAL FLOW.

Two thousand six hundred and twenty-nine cases specified the quantity of their menstrual flow, 1925 belonging to the regular type and 704 to the irregular one. Classifying the quantity of the flow as normal, moderate, profuse, and irregular, we get Table VI as follows:

TABLE VI.

Types	Regular	Per cent.	Irregular	Per cent.	Total	Per cent.
No. of cases....	1925	.....	704	.....	2629	.....
Normal.....	899	46.7	271	38.49	1170	44.5
Moderate.....	305	15.84	141	20.02	446	17.0
Profuse.....	689	35.78	279	39.63	968	36.8
Irregular.....	32	1.66	13	1.84	45	1.7

From the above table we see that the normal flow is leading with 44.5 per cent., next the profuse with 36.8 per cent., and then the scant with 17 per cent. and the miscellaneous 1.7 per cent. Comparing the regular types with the irregular ones, we find that the irregular type in a total of 704 gives 39.6 per cent. of profuse menstruation, while the regular type in a total of 1925 gives 35.7 per cent.; in other words, the irregular type presents a larger percentage of profuse menstruation.

In this connection it may not be amiss to say a few words regarding spotting which sometimes follows or precedes menstruation. This spotting is usually temporary in character and when met with is usually based on some pelvic pathological condition. More interesting, and in our cases more permanent, is the spotting met with about two weeks after menstruation. This spotting, ac-

companied sometimes by pain, is possibly brought about by ovulation.

Here we might also mention two other features we occasionally noticed in connection with the menstrual flow: One of them is the increase of the menstrual flow every second month, sometimes accompanied by dysmenorrhea, which may be absent when the menstrual flow is normal. The other peculiarity occasionally met with is the influence of the season on the flow, the flow being scanty in the cold months and normal in the warm months.

We might mention here the relation of hyperthyroidism to menorrhagia. We found only twenty cases of hyperthyroidism in our series, of which five recorded a normal flow, two a scant flow and thirteen profuse. Thus in these twenty cases 65 per cent. gave histories of profuse menstrual flow instead of the thirty-five given in Table VI.

MENSTRUAL CLOTS.

TABLE VII.

Type of menstruation	Regular		Irregular		Total
No. of patients	452	Per cent.	174	Per cent.	626
Present.....	226	50.0	89	51.14	315
Occasional.....	54	11.95	12	6.89	66
Not present.....	172	38.05	73	41.9	245

Six hundred and twenty-six histories gave information regarding the presence or absence of clots with the menstrual flow. Of these, 245 histories or 39.1 per cent. show an absence of clots, and 381 or 60.9 per cent. show their presence. While this latter percentage may be considered large we were not surprised in finding it so. One has only to carefully inquire of his patients about the passage of fine clots in the menstrual flow to convince himself of their frequency. We may add here that a great many of the clots examined showed shreds of menstrual membrane. The more care one exercises in examining menstrual clots, the more frequently can he find menstrual shreds. Menstrual shreds are not necessarily pathological, and we find no greater percentage of clots in the irregular type than in the regular; in fact, there is a somewhat lower percentage in the irregular one. This finding is in accord with the view expressed by us here and in a previous communication, in which we said: "May t not be that the normal menstruation with the slight shedding of

the superficial epithelium and the exfoliation of endometrial shreds or membranes are the results of the same normal process, the difference being due to the variable degree of intensiveness of the stimulant action of the hormones."[1]

STERILITY.

TABLE VIII.

Type of menstruation	Regular		Irregular		Total
No. of patients	2824	Per cent.	1082	Per cent.	
Single	498	17.63	170	15.71	668
Fertile	1855	65.68	710	65.61	2565
Sterile	471	16.69	202	18.66	673

As shown in this table, 3906 patients gave their social histories, and of these, 668 were single and 3238 married. Of this latter number, 673 or 20.9 per cent. were sterile. This percentage is rather large, but is accounted for by the fact that many of these patients were seen by us shortly after marriage before the first pregnancy could have taken place. These statistics, however, may be of value by comparing the sterility in the regular and irregular types and such comparison shows that the irregular type has a sterility percentage of 22.1 per cent. and the regular 20.4 per cent., indicating a sterility of 1.7 per cent. higher in the irregular than in the regular cases.

DYSMENORRHEA.

By dysmenorrhea we mean discomfort during menstruation, not necessarily limited to pelvic disturbances. Three thousand seven hundred and fifty-eight cases gave information regarding the presence or absence of such dysmenorrhea. Of these, 1974, or 52.6 per cent., had no dysmenorrhea; 1784, or 47.4 per cent., had dysmenorrhea. In other words, the number of women that do not have dysmenorrhea is larger than the number of women that do by 5.2 per cent.

Of the 3758 women studied, 866 belong to the irregular type and of them 510 or 58.8 per cent. gave histories of dysmenorrhea; 2892 belonged to the regular type, and 1274 of them or 44 per cent. gave such histories. The irregular cases then gave 14.8 per cent. more cases with menstrual dysmenorrhea than the regular ones.

[1] Membranous Dysmenorrhea Caused by Endometritis. *Journal of American Medical Association*, October, 1913.

RELATION OF DYSMENORRHEA TO TIME OF FLOW.

Of the 1784 that gave positive symptoms of dysmenorrhea, 1097 specified in a general way the time of the dysmenorrhea in relation to the flow. Classifying them accordingly, we obtained Table IX.

TABLE IX.

Types	Regular	Per cent.	Irregular	Per cent.	Total	Per cent.
Dysmenorrhea before flow	209	29.43	109	28.16	318	28.98
Dysmenorrhea during flow	343	48.3	202	52.2	545	49.68
Dysmenorrhea after flow	5	0.7	4	1.03	9	0.82
Dysmenorrhea before and during flow	133	18.73	62	16.02	195	17.77
Dysmenorrhea during and after flow	3	0.42	1	0.25	4	0.36
Dysmenorrhea before and after flow	16	2.25	0	.....	1	0.09
Dysmenorrhea before, during and after flow	1	0.1	9	2.32	25	2.27

Thus we see from Table IX that 49.7 per cent. had dysmenorrhea during the flow, 29 per cent. before the flow, 17.7 per cent. before and during the flow, 2.2 per cent. before, during and after the flow, 0.3 per cent. during and after and 0.09 per cent. before and after.

THE RELATION OF DYSMENORRHEA TO MENSTRUAL FLOW EXPRESSED IN NUMBER OF DAYS.

Beside the 1097 cases that specified in a general way the time of dysmenorrhea in relation to the flow, 366 cases gave the exact number of days of dysmenorrhea in relation to the days of the flow. Table X shows this relation in order of their frequency.

TABLE X.

No. of days	No. of patients	Percentage	
1 day before	84	22.9	
First day during	79	21.6	
2 days during	36	9.8	
2 days before	31	8.5	
1 day before and 2 days during	21	5.7	
3 days before	19	5.2	
7 days before	19	5.2	
1 day before and during	16	4.4	
2 days, before and during	14	3.8	366
1–2 days during	10	2.8	
1 day before and 1 day during	9	2.4	
4 days	5	1.4	
2 days before and 2 days during	5	1.4	
7 days before and 1 day during	5	1.4	
1 day before and 3 days during	4	1.09	
3 days during	3	.82	
3 days before and 3 days during	3	.82	
Second day during	3	.82	

This table shows that the most common time for the dysmenorrhea is 1 day before the flow, next first day during the flow, then 2 days during the flow, then 2 days before, then 1 day before and 2 days during, then 3 days before, 7 days before, etc.

THE IRREGULARITIES IN DYSMENORRHEAL HISTORIES.

Like in the other menstrual features, so in dysmenorrhea there is a certain amount of irregularity about it, depending on the degree of exertion, condition of general health, condition of the pelvic organs, etc. The factors cited above influencing the regularity of menstruation also influence dysmenorrhea. Two hundred and thirty cases reported favorable influences in their histories from these factors. In 4 cases the early dysmenorrhea disappeared with advance of menstrual life before marriage. In 81 dysmenorrhea disappeared after marriage and in 145 after childbirth. On the other hand, dysmenorrhea developed in women who began their menstrual life without it, as the result of some new pathology; 2 cases before marriage, 54 after marriage, and 85 after childbirth.

MENOPAUSE.

As it is difficult to trace the beginning and final establishment of menopause, the term "age of last period" and "menopause" are used synonymously.

THE AGE OF MENOPAUSE.

Three hundred and eighty-four cases were classified according to the age of their last period, giving also their corresponding ages of puberty. They were arranged in Table XI in order of their menopause age beginning with the youngest.

TABLE XI.

Age of last period, 384	No. of patients	Age of first period, 198
17	1	12
23	1	21
24	2	13–13
25	1	14
26	1	13
28	1	
29	1	15
30	1	11
32	2	18
34	2	14–14–15–16–18

35	7	11–14–15–15–16–16–17–18
36	3	
37	2	19
38	5	17
39	7	12–12–15
40	17	11–12–13–14–15–15–16
41	8	12–13–15
42	14	12–13–13–14–15–17–18–18
43	18	12–13–14–15–15–15–16–16–16–16–17
44	22	11–12–13–13–14–14–14–14–14–14–14–15–15–20
45	21	11–13–14–14–15–15–15–18–18
46	33	12–13–13–13–14–14–15–15–15–16–16–17
47	28	11–12–13–13–13–13–14–14–14–15–15–15–15–16–16–17–17
48	31	12–12–13–13–14–15–15–16–16–16–16–16–18
49	26	10–12–14–14–14–15–16–16–16–16–16–16–18
50	47	11–12–13–13–13–13–13–13–13–13–14–14–14–14–15–15–15–15–15–15–16–16–16–16–16–16–16–16–16–17–18
51	23	12–12–12–13–13–13–14–16–16–17
52	22	12–12–13–13–14–14–14–15–15–15–15–16–16–16–17
53	11	14–15–15–16–16–17
54	10	13–15–15–15–15–16
55	6	14–15–15
56	2	14
57	2	13
58	2	11
59	2	13–18
68	1	13
60	1	
Age not given		13–14–14–15–17–18

Total menopause cases, 384.

According to this table, the most common age for the menopause is 50, the next 46, then 48, 47, 51, 49, 44, 45, 52, 43, and 40. Taking the percentages in periods of five years we find them as follows:

TABLE XII.

	Per cent.
45–50	36.0
50–55	28.3
40–45	21.4
35–40	5.6
55–60	3.9
30–35	1.1
25–30	1.1
20–25	0.8
Above 60	0.5
Below 20	0.3

LENGTH OF MENSTRUAL LIFE.

The length of menstrual life, that is, the number of years between the age of puberty and the menopause, presents considerable variation. The total number of patients giving the length of their menstrual lives is 190. Arranging their menstrual lives in order of their frequency we get Table XIII.

TABLE XIII.

Length of menstrual life	No. of patients
37 years	17
35 years	17
33 years	17
30 years	16
34 years	13
31 years	11
32 years	10
27 years	10
39 years	8
36 years	8
38 years	7
29 years	6
28 years	6
24 years	6
40 years	4
26 years	4
41 years	3
25 years	3
19 years	3
18 years	3
22 years	2
21 years	2
14 years	2
2–55 years	12

From this table we see that the most common number of years of menstrual life is 37, followed by 35, 33, 30, etc.; that 68 per cent. of women have a menstrual life of 30 years or more; that the longest menstrual life among our patients was 55 and the shortest 2 years.

RELATION OF AGE OF PUBERTY TO THAT OF MENOPAUSE.

The relation of the age of puberty to the menopause is rather interesting. It is the belief of the laity that the earlier the age of puberty the earlier the age of menopause. On the other hand, we

met with the opposite opinion in literature. Table XIV shows the relation of puberty and the menopause based on 220 cases, giving the age of each.

TABLE XIV.

Age of first period	No. of patients	Age of last period
11	9	30–35–40–44–45–47–48–50–58
12	19	17–39–39–40–41–42–43–44–46–47–48–48–49–50–51–51–51–52–52
13	34	24–24–26–40–41–42–42–43–44–44–45–46–46–46–47–47–47–47–48–48–50–50–50–50–50–50–50–50–51–51–51–52–52–52–54–57–68
14	39	25–34–34–35–40–42–43–44–44–44–44–44–44–44–45–45–46–46–47–47–47–48–49–49–49–50–50–50–50–51–52–52–52–53–54–54–55–55–56
15	47	29–34–35–39–40–40–41–42–43–43–43–44–44–45–45–45–46–46–46–47–47–47–47–47–48–48–49–50–50–50–50–50–50–50–50–52–52–52–52–53–53–54–54–54–54–55–55
16	45	34–35–40–43–43–43–43–46–46–47–47–48–48–48–48–48–49–49–49–49–49–49–49–49–49–50–50–50–50–50–50–50–50–50–50–51–51–52–52–52–53–53–54
17	12	35–38–42–43–46–47–47–50–51–52–53
18	12	32–32–34–37–42–42–45–45–48–49–50–59
19, 20, 21	1 each	37–44–23

SAME IN PERCENTAGES OF TEN YEARS IN RELATION TO AGES OF PUBERTY.

Studying Table XIV and arranging same in three classes, (1) those below 40, (2) those between 40 and 50, (3) those above 50, and taking their percentage in accordance with their ages, we get Table XV.

We see from this table that the highest percentage below 40 was in patients whose age of puberty was 11 and 18; the highest percentage between 40 and 50 was in patients whose age of puberty was at 12, 18 and 14; and the highest percentage above 50 was in patients whose age of puberty was at 16 and 13.

This table, while not indicating any definite relation between the age of puberty and the menopause, seems to show that the very early and very late puberty cases reach menopause early.

Table XVI is added here to show at a glance the percentage of menopause cases past forty-five in patients classified according to their age of menstrual onset.

TABLE XV.

Age of first period	Age of last period
11	25.0 per cent. below 40. 50.0 per cent. between 40 and 50. 25.0 per cent. at 50 and above.
12	16.5 per cent. below 40. 55.5 per cent. between 40 and 50. 28.0 per cent. at 50 and above.
13	10.0 per cent. below 40. 45.0 per cent. between 40 and 50. 45.0 per cent. at 50 and above.
14	9.5 per cent. below 40. 55.0 per cent. between 40 and 50. 35.5 per cent. at 50 and above.
15	11.5 per cent. below 40. 51.5 per cent. between 40 and 50. 37.0 per cent. at 50 and above.
16	3.3 per cent. below 40. 46.7 per cent. between 40 and 50. 50.0 per cent. at 50 and above.
17	20.0 per cent. below 40. 50.0 per cent. between 40 and 50. 30.0 per cent. at 50 and above.
18	22.25 per cent. below 40. 55.5 per cent. between 40 and 50. 22.25 per cent. at 50 and above.
19, 20, 21	66.6 per cent. below 40. 33.0 per cent. between 40 and 50.

(Menopause at 37, 44, 23.)

TABLE XVI.

Percentage Number of Menopause Cases Past 45 Years of Age.

Past 45 years..	11 years...	12	13	14	15	16	17	18	19	20	21
	50 per cent	57.2	73.3	58.6	67.6	88.3	60	55.5	0	0	0

According to this table, the highest number of menopause cases past 45 was seen in patients whose age of puberty was at 16, then 13, then 15, 17, 14, 12, 18 and 11. The three cases of late puberty, one each for 19, 20, 21, stopped menstruating below 45. These figures seem to confirm the idea expressed above that the very early and very late puberty cases develop the menopause early.

RELATION OF MENOPAUSE TO LAST CHILDBIRTH.

It may be interesting to notice the relation of the last menstrual period to the last childbirth. One hundred and nine cases gave the

age of the last childbirth and the age of the last menstrual period, and on this number of cases we base the following table:

TABLE XVII.

Time between last childbirth and menopause	No. of patients
0*	6
1–5 years	11
5–10 years	31
10–15 years	25
15–20 years	22
20–25 years	10
Above 25 years	4

We see from this table the last menstrual period most commonly occurs 5 to 10 years after the last childbirth. Next in frequency 10 to 15 years, then 15 to 20 years, 1 to 5 years, 20 to 25 years, then immediately after, and then above 25 years.

INFLUENCE OF RETRODISPLACEMENT ON MENSTRUATION.

A point of interest in connection with our study is the influence of retrodisplacement on menstruation. We collected 357 cases of retrodisplacement and obtained from them information regarding dysmenorrhea, quantity of flow and sterility.

Three hundred and fifty-seven gave information regarding *dysmenorrhea:*

177	no dysmenorrhea.
180	dysmenorrhea.

Three hundred and sixteen gave information regarding *quantity of flow:*

168	normal.
101†	profuse.
45	scant.
2	irregular.

Three hundred and sixty-three gave information regarding *sterility:*

93	sterile.
33	only miscarriages.
197	fertile.
39	single.

* Patients never menstruated after last childbirth which occurred at 34, 37, 42, 44, 45, 45 respectively.

† Among the 316 patients thirty-nine were single, most of whom presented undeveloped uteri. This accounts for the comparative low number of profuse menstruation. If we exclude the single patients the percentage of profuse menstruation will be much larger.

Arranging the facts collected here in a table of percentages and comparing them with the corresponding general statistics, we get the following:

TABLE XVIII.

	Statistics of retroversion, per cent.		General statistics, per cent.
Dysmenorrhea	50.4		47.3
Sterility	28.8	Abortions 10.2	20.8
Profuse flow*	32.1		37.4
Scant flow	14.3		17.3

MENSES DURING LACTATION.

One hundred and two patients gave information regarding menses during lactation. Of these, seventy-four gave positive histories.(1) Some of these seventy-four patients menstruated during lactation of each of their children, others only while nursing one or two.

The periods were not of the patient's usual type; they were frequently of longer interval.(2) The periods of amenorrhea preceding the establishment of menstruation were found to be very variable, as seen from Table XIX.

TABLE XIX.

1 month after childbirth	7
6 weeks after childbirth	1
2 months after childbirth	1
3 months after childbirth	8
4 months after childbirth	3
5 months after childbirth	4
6 months after childbirth	2
7 months after childbirth	7(3)
8 months after childbirth	4
9 months after childbirth	1(4)
9–10 months after childbirth	1
1 year after childbirth	1
14 months after childbirth	2
18 months after childbirth	2
Time not given	30

1. One never menstruated for twenty years on account of pregnancies and lactation.

2. Most of them menstruated regularly, but some irregularly

* Among the 316 patients thirty-nine were single, most of whom presented undeveloped uteri. This accounts for the comparative low number of profuse menstruation. If we exclude the single patients the percentage of profuse menstruation will be much larger.

(one every six months, another every two months and another every two or three months).

3. One of them stopped menstruating when three months pregnant. Another one in a previous pregnancy began to menstruate after the first month of lactation

4. Acted the same with all children. (Some behave differently with the lactation of the different children.)

MENSTRUAL DISTURBANCES FROM CHANGE OF CLIMATE.

We found among the histories twenty-two who gave menstrual disturbances as a result of change of climate; eighteen of them noticed the disturbances in changing their residence from one continent to another and four upon changing their residence from state to state. Eighteen developed amenorrhea, three developed more frequent menstruation, and in one menstruation re-established itself after a year of menopause. After menopause of a year's standing this patient undertook a trip to Europe for three months where she menstruated regularly for three consecutive months and then upon her return to this country menstruated a fourth time.

CONCLUSIONS.

Our statistics, for reasons given in our introduction, may not give us as correct an idea of menstruation as we would wish, but they were compiled carefully from our own histories, *i.e.*, from histories taken by ourselves, and therefore are as near correct as they can ordinarily be made.

The observations made were many. Many more could have been made. We shall concisely enumerate the most important ones in our conclusions.

Seventy-five per cent. of women menstruated regularly and 25 per cent. irregularly. The most common regular type met with was that of 28 days, which constituted 72 per cent. of this type. The 30-day type followed next in frequency with only 3.8 per cent., and the 21-day with 3.3 per cent., etc. In some of the 31-day type the menstrual flow appeared monthly on the same date independent of the number of days in the month. The most common irregular types were 3 to 4 weeks, then 4 to 5 weeks, 2 to 3 weeks, 5 to 6 weeks.

The most common ages of onset in order of their frequency were 13, 14, 15, 12, 16. The age of onset did not show any relation to regularity or irregularity of menstruation. The earliest age of onset in our series was 9 years and the latest 24 years.

The most common duration of menstrual flow was 3 days, then

4 to 5 days, 3 to 4 days, 5 days, 7 days and 4 days. The irregular type of menstruation showed a larger percentage of long durations and smaller percentage of shorter durations than the regular type.

The quantity of flow in 45 per cent. of women was normal, in 17 per cent. scant and in 37 per cent. profuse. Irregular patients showed a higher percentage of profuse flow than the regular ones. Hyperthyroidism cases showed a very high percentage of profuse menstrual flow (65 per cent.).

Clots were very frequently found in menstrual flow and we did not find them to be influenced by menstrual irregularity.

Forty-seven and four-tenths per cent. of women suffered from dysmenorrhea (if the term dysmenorrhea is to convey the idea of discomfort). In retrodisplacements the percentage was found to be 50.4 per cent. In 50 per cent. of the dysmenorrhea cases the symptoms appeared during the flow, in 29 per cent. before, in 17 per cent. before and after, and in the rest after the flow or during and after. Most frequently the dysmenorrhea appeared the day before the flow, then the first day of the flow, then 2 days during, 2 days before, 1 day before and 2 days during, then 3 days before, and 7 days before.

Improvement in menstruation was frequently noticed with advance of menstrual life, after marriage and after childbirths, menstrual periods becoming more regular and the dysmenorrhea improving or disappearing entirely.

The most common ages of menopause in order of their frequency were given as 50, 46, 48, 47, 51, 49, 44, 45, 52. The length of menstrual life was most commonly given as 37 years, then 35 and 33. Sixty-eight per cent. reported a menstrual life of 30 years or more. The very early and very late ages of puberty showed a rather early menopause.

THE PRINCIPLES OF GYNECOLOGY.

BY

HENRY S. LOTT, M. D.,

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THIS subject is approached with reverence. In its approach is a clear-cut picture of one of my earliest teachers, Dr. Henry F. Campbell. At the beginning of a lecture he would say: "Take the shoes from off thy feet for 'tis Holy ground upon which we tread." This truth, and truth it is, should not be overlooked.

Let us define the term: *First*, "Gyneco, in composition, or 'make up' a woman." *Second*, "gynecologia, or gynecology, the doctrine of the nature and diseases of woman." *Third*, "gynecologist, one who devotes himself especially to, or is well acquainted with, the nature and diseases of woman."

In our work, and in our writings, do we grasp the broad and fine embrace of such a definition, and that in very truth it means, not *destruction*, or *distortion* of organs, but *conservation of the procreative functions of womanhood?* That this presents a most complex and difficult feature, I fully agree; for that men should know, or be well acquainted with the nature of woman, is a possibility most remote; and I care not to take upon myself the task of bringing it from the shadow-land of doubt.

However, the fact that we cannot fully comprehend the nature of woman, should only awaken the ready sympathy and quick conception which will guide us in gaining her confidence, and teach us the recognition of such departures from the normal as are peculiar to her sex and functions. Therefore, the normal woman, and her study, should be our first consideration; remembering, that in walking through the forest no two trees are exactly alike, yet each is nature's product, and perfect of its kind and fashion. Lawson Tait has said that "The vaginæ of women differ as much as their faces;" and his saying pertains also to type of womanhood, and performance of physiologic function.

Woman's life is a cycle, embracing three important eras; maiden, wife and mother. And a fourth, perhaps with retrogression of the vital currents. Let us consider them for a moment, and get a

mental picture with the glow of health upon it. In the virgin, before the menstrual cycle has begun and, also, before attacked by either trauma, or infection, a pear-shaped uterus with a normal forward inclination, swinging between the bladder and the rectum on its vaginal and ligamentary supports, and thus forming the body of the "bat" whose outspread wings, on either side, are of so much interest because of the beautiful part they play in the process of procreation. Nestled within the broad ligaments, which contribute to the make-up of the outspread wing, the ovary lies, quiescent and expectant, awaiting the responsive clasp of the delicate fimbriæ, so wonderfully arranged at each terminus of the Fallopian tubes which form the inviting and receptive channels both of ingress and of egress between the uterus and the pelvic and abdominal cavities. Now, let us picture for a moment these organs and their functions just matured and free from all disease or other injury.

The uterus and its position are such as to invite travel, both in and out, along the Fallopian tubes, *and the lining membrane such as to encourage the migrating spermatozoa in search of the factor essential to vital development.* This factor, furnished by the ovaries at periodic intervals, and, I believe, most freely just after the menstrual epoch, finds its way into the uterus by way of the Fallopian tube, into whose channel it is taken by the clasp of its fimbriæ. In the normal woman the tubes are always patulous; the ciliæ of their lining membrane waving to and fro and favoring the normal currents; while the terminal fimbriæ, when the woman stands erect, are not engaged in spasmodic clasp of the ovary, but "float free, like a fish's fins in water." How delicately beautiful and how delicately sensitive is this mechanism, and, how very easy it is of perversion, through both pathologic and surgical agencies; and in doing repair to these structures, the question is not: Will the patient withstand the procedure? but, *Will normal conditions be restored, and normal functions retained?*

This picture consists of normal conditions, with normal and recurrent turgescence and retrocession of the menstrual wave; and is at this pole also, of the ovary quietly maturing and throwing off its product to be caught within the clasp of the outspread fimbriæ of the tube, to be sent on its journey to the uterus, there to find the vital element essential to its life and full development or, failing, to be lost. Before maturity and before the marital relations are begun, the exanthemata play the greatest part in distorting these organs. They frequently mar the physiologic picture just portrayed.

Infection from within, in this period of life, is unavoidable. During a recent visit to the "centers," it came to my knowledge that men were teaching in clinics, to graduates, the use of the stem pessary in virgins. Think of it!! The invasion; the trauma; and, infection; to say nothing of the distortion and abnormal position of the uterus afterward! Emmet has told us, long ago, that such "treatment," along with dilatation and applications, is much more often hurtful than helpful.

With puberty comes the menstrual wave, accomplished in minor cycles of *turgescence* and of *retrocession;* and the awakening of the dormant procreative organs. Each month completes its cycle. Do we think of this enough? Do we realize the important part it plays, in the physical economy of young women? Like the ebb and flow of the ocean wave, the blood currents come and go. Twenty-eight days complete the cycle, *and the uterus is the storm center.* Under normal conditions, when there is no clog or break in the mechanism nature performs this function without seriously disturbing young women, but remember the delicacy of the structure and the central guidance of nerve control. Remembering this, can it be a cause for surprise that conditions from within, of mental origin, and conditions from without, of climate, of environment, and of physical stress, interrupt these vital currents? They either break or shorten the cycle with marked, or even distressing, results. Therefore, painful menstruation and its cause, in the virgin, is of such complex nature as to make each case a law unto itself; and its approach and treatment a matter for profound thought and most careful investigation.

With the marital relations, woman enters the second important era in her life. Infection is the first and greatest danger which confronts her. I very well remember what Dr. Joseph Price said while at work, and with the resultant pathology in his hand, namely: "A man with an active, or a latent gonorrhea, is a far greater menace to the populace than a murderer. In the one case, the victim is only one, and the criminal confined by law; while in the other, the victims are many, and all of the most innocent class.". The sequelæ to such infection are familiar to you all; repeated, and incomplete abortions, with pelvic exudate, abscess of ovaries, pus tubes; and, if the life of the victim be spared, chronic invalidism.

Of equal importance is trauma, in the process of parturition, and the resultant infections of the puerperium. Childbirth is the fulfillment of a physiologic function. It should be accomplished, in

the large majority of cases, by nature's forces without accident. But as it is never devoid of danger, the patient should always be in the hands of a skilled and watchful attendant.

An attempt to enumerate the accidents of childbirth and the puerperium, would exceed the limits of my time. I simply wish to state that we do know that injuries to the outlet, either the cervix, the vaginal walls, or the perineum, have no treatment, other than surgical repair; and that all treatment, like intrauterine medication is irritating in character, and not only hurtful to the site of the wound, but to the resulting scar tissue, and causing reflex, scar-tissue neuroses.

Every childbirth is a surgical case; it should be conducted with care, precision, and cleanliness; and, until this is taught and thoroughly understood by the "man in the field," the gynecologist will continue to have the sequelæ of puerperal infection in his clinic. Trauma is inevitable; *infection is not.*

With the passing of the child-bearing period, comes the final era in the life cycle of womanhood; the era of retrocession of vital currents; embracing in its beginning—the summit of womanhood; from which she sees, *on the one side* her life-work, with its developments, or its disappointments; *and on the other*—nature's *incline*, with its kindly, but *inevitable* atrophic changes. An era filled with light of *retrospective* accomplishment, as a rule; and also with shadow or forecast of the pitfalls on the road to be traveled.

The life filled with accomplishment, meaning a life of procreation, we must consider in addition to normal retrogressive changes, inevitable depletion of vital currents and vital structures; it is the cost of reproduction—"waste being in excess of repair" (Emmet). In this era, comes decensus of organs from two causes, both of which are the result of parturition. From above, we have the overworked ligamentous supports are no longer taut and, therefore, no longer a support; from below, we have laxity of the vaginal walls, and destruction of the perineum, resulting in prolapsus uteri. Again, and of greater import, we have a patulous outlet inviting access of filth, hastening degenerative changes in the cervix and endometrium and presenting a strongly inviting medium for malignant and other diseases.

The uterus, in addition to its office of carrying the fetus, has two important functions: anatomic and physiologic. *First*, when we consider its normal position, we must recognize the uterus as the *key-stone to the intrapelvic cellular arch;* and in its removal short of tumor or established malignancy, this should be well considered.

With the perfect toilet and simple operation technic of to-day, the importance of this anatomic relation is, sometimes, overlooked. *Second*, of equal, or greater importance, is the fact that "*the uterus is the organ of menstruation.*" Vague theories have been advanced from many sources, fixing the control of this function upon certain nerves and upon ovarian stroma; but this has never been established. The fact that the uterus, with its turgescent endometrium, is the *storm center* throughout the cycle of recurrent menstruation and in the subsequent period of retrogression, remains beyond dispute. Therefore, after removal of the ovaries, recurrences of menstruation are likely to occur until retrogressive, atrophic changes in the uterine endometrium prevent its becoming a "storm center" of congestion.

Ovarian stroma, transplanted anywhere, is always an experiment. It neither perpetuates the recurrent cycle of menstruation, nor lessens the nervous phenomena accompanying accommodation to altered conditions in the economy. Furthermore, being prone to cystic degeneration, its presence under abnormal relations favors such pathology in the future of the patient. Much of the work of to-day is not gynecology at all, but mechanics; and in our mechanics, are we forgetting the woman?

The menopause, the final era in the life-cycle of womanhood, presents a broad and fertile field, both for accident, and for error. The cost of living, the cost of producing with its lowered vitality and patulous outlet, creates a fertile and inviting soil for access of filth and infection; of either external or internal origin. Woman's dread of it is not without foundation and it is the minority, rather than the majority, who make the journey without discomfort or accident. The inherent function of the uterus with its hyperplastic tissue cells, is to produce; and many women in this era, who have not been permitted to bear a child, and who resent a life of idleness, will produce a fibroid or a myoma.

At this period, when nature's aim is atrophic, retrogressive changes within its structure, the uterus is prone to invasion, by either malignant or tubercular disease. Excessive flow throughout this period, or at recurrent intervals, accompanied by a turgescent and inviting endometrium is not the exception, but the rule. The wonder is not the number who fall victims to these conditions at this time, but that so large a number escape; and in whom the "storm center," after its period of rebellion and of retrogressive, atrophic changes, becomes again quiescent and permits a safe and comfortable end of life.

Our chief advances lie in early recognition. Conditions and pathology do not change, but each decade brings its staff of teachers and of workmen, and the "pendulum" swings because the workmen change.

"True to one word, and constant to one aim—
Let man's hard soul be stubborn, as his frame;
But leave sweet woman's mind and form at will—
To bend, and vary, and be graceful still."

DISCUSSION ON THE PAPERS OF DRS. SANES AND LOTT.

Dr. Rufus B. Hall, Cincinnati, Ohio.—I want to discuss briefly the paper read by Dr. Lott which is a classical literary production. I was going to say that it is almost a poetic contribution, and it is one that few of us would hope to be able to put in such a beautiful dress or ideas. The paper as a whole I wish to endorse, and have no criticism to offer, but I cannot agree with all the sentiment and advice given in the paper. I contend that there are certain patients classed in the paper as virgins, unmarried women, with painful menstruation, who could be relieved by cureting and the use of the stem pessary. But the essayist criticises the use of the stem pessary in such cases. In properly selected cases, we can relieve such patients of their menstrual pain with a stem pessary treatment who could not be relieved by any other method of treatment with which I am acquainted. Therefore, I do not wish to let this paper go out from this Association without at least one of its members standing up for the use of the pessary. I spoke to the doctor just before he left the hall, saying that I was sorry he was about to leave for home; that I was going to compliment him in some particulars and throw bricks at some of the other respects of the paper because we are here to express our individual opinion and to stand for our individual judgment. What are we to do for these patients? You all see them. Dr. Lott has put a good deal of sentiment into his paper regarding these cases. Among other things, he said, you would not, if it were your own daughter, have a vaginal examination made; you would not have a stem pessary placed in the case of your own little daughter. Unfortunately I have but one daughter, and I wish I had more, but if it were necessary that my daughter should be treated in this way, I certainly would not hesitate to have her treated in this manner. I have always practised gynecology just along the lines that I would like to have my own daughter or my own wife treated. I would want them to get the same kind of treatment that I advise for others, and that is what I expect to do in the future. But there are cases, gentlemen, whether you believe it or not, properly selected cases of painful menstruation in unmarried women, that you can relieve by the stem pessary that you cannot relieve in any other way that I know of. I am relieving them every year, and other doctors are

relieving them who are willing to use this form of treatment. I will give you an illustration for the sake of making it plain.

I have in mind a young girl whom I saw a few years ago. If you saw that girl in your office and talked to her, you would think she was a well-developed woman; she is a fine-looking woman physically, perfectly developed in every way. There was nothing wrong with her only she had pain during menstruation from the time she began until she was twenty. During each menstrual period for a year or so just passed she was obliged to have from one to three or four hypodermics of morphin administered. She had three or four very fine physicians examine her, and no pathology could be found. No kind of treatment would afford permanent relief. I examined her carefully, and I could not find any pathology. There had never been any infection. The microscope proved that; the clinical history sustained the microscope. The case was curetted carefully and a stem pessary placed. In the first period she was put to bed for conservative purposes. She did not take any more morphin nor was there any required. She had some pain for three hours at time of first period. The next period came on without her knowledge. She did not take any morphin and has not had any since. It is six or seven months now since I began treatment. She wore a stem pessary for five months. She is well.

I could go on and enumerate several similar cases to that in which every known treatment was tried except the use of the stem pessary without relief. I have had some of these bear children after. They do not get infection from placing the stem pessary. There is no more danger connected with the insertion of the stem pessary than there is without it. In properly selected cases we can cure these patients by the use of the stem pessary. I do not mean that we can do so in a woman who has a pelvic inflammation or who has had infection, a fixed uterus, or a diseased ovary. It is not *indicated in cases that have a pathological* condition which can be discovered in the pelvis. I for one am not willing to let this discussion go without a word in favor of the use of the stem pessary.

Dr. O. H. Elbrecht, St. Louis, Missouri.—Will you please tell us how you put the stem pessary in?

Dr. Hall.—The technic of the operation is to dilate the uterus moderately, curet carefully, and swab out the uterus with equal parts of compound tincture of iodin and carbolic acid. After placing the pessary leave it there for four or five months.

Dr. Elbrecht.—Is it the Wylie pessary?

Dr. Hall.—It is a metal pessary, and I think it is known as Carstens pessary.

With regard to the paper of Dr. Sanes on menstrual statistics, it is a long statistical paper showing a great amount of clinical work necessary to have collected it, together with examinations and tabulations of menstrual periods, but to me, as I listened to it, it seems useless waste of energy and of time. I cannot see anything to be ained by it in a scientific way unless we can know positively whether there is or is not pathology in the individual patient's pelvis. These

statistics of menstrual periods seem to establish the fact that women menstruate in twenty-eight or twenty-six or twenty-seven days. Unless we know that these patients are all free from a pathological condition in their pelves, the statistics are useless, so far as the object intended to be gained by them is concerned. If it is intended to demonstrate that woman with a pathological condition in the tubes or ovaries or uterus menstruates differently and more frequently, then we have some information. A woman with a pelvic inflammation sometimes will menstruate very freely and at shorter intervals than a woman who is normal. If the doctor will tell us whether these are records kept of patients who are free from pelvic pathology, then I will grant that his paper is a valuable contribution to the science of gynecology.

Dr. D. Tod. Gilliam, Columbus, Ohio.—In speaking of the stem pessary I desire to refer to the glass, stem pessary of Hepperlin which I regard as the ideal instrument for use in the class of cases under discussion. I have been using it now for a great many years and am persuaded that the principle of it is absolutely correct. I suppose some of you are acquainted with it and wish that all of you might be as I regard it as one of the most valuable contributions to the gynecological outfit of the present century.

It is a glass, stem pessary with a flange at the lower end in which are two holes for the purpose of suturing it to the cervix.

It is made of solid, flint glass and is practically unbreakable therefore no one need be affraid to use it for fear of accident.

The only contraindication to its use so far as my own experience goes is some pathological condition above the vaginal vault, but you may have pathology of the uterine cavity or the cervix and instead of being a detriment it is an actual advantage because it supplies drainage the most essential of all remedial measures. You cannot get effects equal to it in any other way. If there is a bend in the uterus the stem pessary corrects it permanently. If the uterus is of undersize and not functioning the stem pessary promotes development and establishes menstruation as nothing else will. Longitudinal perforations or grooves on the side of a stem pessary for the purpose of facilitating drainage are bad for the reason that they become clogged and foul and foci for infection. The solid glass, stem pessary is the only kind of pessary that will not become foul. I have often removed it after having been worn for months with scarcely a perceptible odor clinging to it.

I usually keep them in from three to five months. The stitches of silkworm gut should be placed deeply in the cervix and tied loosely or they are liable to cut out. After dilating the cervix and cureting, if need be, the sutures are placed and after being threaded through the holes in the flange of the pessary are secured by clamp forceps. The pessary is then introduced and tied. Occasionally there will be a woman of highly neurotic type who will rebel against the stem pessary but such cases are few and far between, the vast majority not being aware of its presence. When the menstrual period approaches the cervix dilates and the blood escapes through

the space between the stem of the pessary and the cervical wall. Under pathological conditions there is no more efficient method of promoting drainage and as drainage is indispensable to cure in such cases it follows that the stem pessary is the treatment *par excellance.*

Dr. Sanes (closing the discussion).—These statistics were carefully compiled with the assistance of my Interne, Nurse and Secretary. They were based only on menstrual histories of my patients during their normal health. I realize that it is difficult to compile reliable statistics on menstruation, for as I mentioned in the introduction, it is not an easy matter to get accurate menstrual information from patients. Some of the statistical data on menstruation are more exact and are of greater value than others. In our experience, for instance, the data on "The onset of menstruation" and on "Menstruation during lactation" and on "Menopause" were easier to obtain and were found more reliable than that on the "Menstrual types." Again, some data while apparently difficult to collect, may be exact and reliable when obtained under favorable circumstances. Thus, while exact statistical data regarding "Menstrual clots" are usually hard to get, we found no difficulty in compiling them, having been carefully collecting menstrual clots of our patients for some time in connection with another study.

Dr. H. S. Lott (closing).—Leaving the Sessions in Pittsburgh before their close, was a matter of much regret, but a case at home demanded my presence, and I felt that I must go. The privilege of closing the discussion of my paper comes through the courtesy of our Secretary, Doctor Zinke, and I thank him for it.

Dr. Hall, in his kind and courteous way, has paid me a very high compliment, in the beginning; one well worth the labor of earning, and one that I shall never forget. The "poetry" of nature is very beautiful, and very true, and when we eliminate "sentiment" from any feature of our work, in which we deal with *vital* elements, we have become mere mechanics, and to the gynecologist I only beg to emphasize the truth of my appeal for a consideration of this factor in his work.

Dr. Hall's defense of the stem pessary, is perfectly frank, and perfectly honest. In his hands, with his refinement of diagnosis, and his perfection of toilet and technic, it is possible that its use may not be disastrous; but I must confess, that in a general way, my opinion of its dangers is not changed at all. To my mind, with due consideration for end results, and in the hands of the general workman, the *Invasion* is unwarranted and unjustifiable, the *Trauma* to the outlet unavoidable, and the danger of *Infection* so great, and so certain, that it will occur, bringing its sequel of disastrous results, in a very large majority of cases.

ANESTHESIA IN GYNECOLOGICAL OPERATIONS.

BY

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We have witnessed a great revival of interest in the subject of anesthesia during the last few years. Many new methods have been introduced and some older ones have been revived. As is always the case, each finds its enthusiastic advocates. All methods should be used with discrimination and judgment, and when this is done by those who have the knowledge to select the cases, the mortality and morbidity of anesthesia will be materially lessened.

The necessity of exact dosage for drugs in the solid and liquid form has long been recognized. With volatile and gaseous drugs, dosage has remained inaccurate and in gauging anesthetics given by inhalation, the patient has been used as the only available indicator of the amount of the drug administered. This is very unscientific and differs from our aim in the ordinary employment of drugs. There can be no doubt that gaseous drugs should be administered in exact amounts, and this can be accomplished only by a physical measuring instrument which indicates accurately, not only to the anesthetist but to the operator as well, the percentage of drug which is being inhaled. When this method is established, the safety and efficiency of surgical narcosis is increased and the shock and post-operative discomforts are brought almost to a minimum.

There is no anesthetic which can be applied indiscriminately that will meet all requirements. Chloroform produces a pleasant sleep with few discomforts, and so far as its immediate dangers are concerned, it is fairly safe in the hands of a good anesthetist. Sudden death from chloroform was formerly attributed to giving vapor which was too concentrated, thus causing death from paralysis of the heart. The introduction of the dosimetric system seems to have lessened this danger, but recent experiments by Levy and others have demonstrated that sudden death occurs in animals under light chloroform anesthesia and is due to ventricular fibrillation. He concludes (1) that there is an irritable condition of the heart under light chloroform anesthesia, the danger of which is

lessened under deep anesthesia; (2) that abnormal ventricular beats are evoked in the heart under chloroform by conditions which stimulate it or by equivalent conditions which remove or reduce depressing influences; (3) under conditions of light chloroform anesthesia the ventricular irregularities resulting from cardiac stimulation terminate in ventricular fibrillation and death of the heart.

Its effects upon the liver occur so regularly and surely that its use may greatly increase the danger of an operative procedure. We have demonstrated that even when given under the dosimetric system, a dog kept under chloroform for two hours at a time and then killed, shows extensive necrosis in the liver. This experiment was undertaken with the hope that possibly, when administered in this manner, liver changes might not occur as they do when chloroform is given by the ordinary drop method.

Ether is undoubtedly the safest anesthetic we have to-day so far as danger during administration is concerned, also in the secondary changes in the liver and other organs, but we must admit if we are unprejudiced that many deaths following its use should be charged to its account. It would be exceedingly interesting and valuable to have the correct mortality which undoubtedly follows its use and is due directly to its effect. It is much higher than commonly supposed.

Since the introduction of the drop method of giving ether, the majority of operators have been quite satisfied with its use, and in our large clinics its steady employment is continued. Expert anesthetists appreciate the superior value of ether vapor and many advocate this method, even though it is given by a simple apparatus without means of measuring the exact percentage. An instrument which gives accurate information to the operator relieves him of much unnecessary worry. The advantages of ether vapor are the lessened quantity of mucus which is caused by the refrigeration in immediate contact with the mucous membranes when given directly over the mask; less postoperative nausea incident to the swallowing of ether-laden mucus; easier control of the degree of anesthesia and, as a result, much less shock. The anesthetometer devised by Connell is a valuable instrument.

Nitrous oxid and oxygen, without the acceleration afforded by considerable quantities of ether, cannot be used routinely and in many instances is entirely contraindicated. Local anesthesia is ideal when it may be successfully applied and fortunately has a wide field.

Occasionally we find the "narcosis" anesthesia of value, and we

practically always precede our local and spinal anesthesia with injections of hyoscine and morphine, which allay the patient's nervousness and remove any objection to consciousness during operation. It is not at all unusual to have the patient sleep throughout the operation, if not disturbed. This preliminary dammerschläf is particularly valuable in operations under local or spinal anesthesia in highly nervous or insane patients.

The value of nitrous oxid, supplemented by local anesthesia, has been demonstrated by Crile. There is no doubt that if all nerves supplying the field of operation are blocked that shock is reduced to a minimum. This can be accomplished in many regions, but not in dealing with pathological conditions of the pelvic organs in women. Here a simple infiltration of the abdominal incision helps but little, for it is the trauma incident to the removal of densely adherent structures which is the principal factor in the causation of shock, and it is impossible to block all the nerves supplying these organs from within the abdomen. The gynecologist can best appreciate the amount of shock which necessarily accompanies certain difficult operations, such as cases of badly adherent tubes caused by infection, or large fibroids complicated by dense adhesions. The mortality in these cases is high and it is due mostly to the shock and hemorrhage caused by the difficult removal. The value of Crile's theory, so far as it goes, leads to the consideration of the advisability of blocking the nerves either by injecting the solution into the nerves where they escape from the spinal canal or, in selected cases, the use of spinal or lumbar anesthesia. It seems reasonable that if the technic that partly blocks the nerves is valuable, one that goes to the fountain head completely blocking the entire nerve supply must be more so.

Fifteen years ago the writer witnessed a sudden death upon the operating-table under spinal anesthesia. The accident was a tragic one and the prejudice formed against the method lasted for many years. The drug used at that time was cocain. During the last few years the advent of the newer synthetic preparations, such as stovain, novocain and others, has led to greater safety. Observation of the work done by some of the men who have patiently and persistently continued to perfect the technic has convinced us that it is a valuable form of anesthesia when given after a careful study of the physiological action, and by one who knows its contraindications, the latter certainly as important as the former. It has been used by many operators over the world with varying success. Some continue to use it and are enthusiastic; others use it for a time and

then, after an accident, discard it, concluding that it is a dangerous method.

A careful study of the literature leads to the conclusion that it has passed through a very stormy period. Extreme enthusiasm which led to unfortunate results has given way to a sane appreciation of its value when used with caution and full knowledge of its contraindications.

Before undertaking this form of anesthesia, one should be familiar with the action of the drug when thus administered, also the physical properties of the cerebrospinal fluid. It should be remembered that when a solution is introduced within the dura, that it falls or rises according as its specific gravity is less or greater than that of the spinal fluid, which has an almost constant specific gravity of from 1.005½ to 1.006½. This is important because it shows the necessity of knowing what will become of the fluid when injected for anesthesia. A knowledge of the required dosage and where the fluid goes after injection within the dura is essential to good results. As the slightest difference in the specific gravity of the fluid introduced may cause it to rise or fall, it has been found safer to use a fluid which is either heavier or lighter than that of the cerebrospinal fluid. Neglect of this precaution has doubtless been the cause of accidents, as it is not possible to otherwise control the direction of the fluid after introduction. The injection is followed almost immediately by loss of sensation in the parts controlled by the nerves affected, and the extent of the anesthesia depends upon the height reached by the solution. This may be controlled by the point of introduction and the position of the patient. Much may be learned about the physiological action, technic, etc., from the writings of Babcock and Sellheim.

After an experience with spinal anesthesia covering a period of two years, the writer is convinced that it is of great value, and that it will eventually find a high place among the methods of anesthesia, particularly for surgical procedures in the lower abdomen and pelvic cavity. The time is not here, however, when it can be used indiscriminately and by those who are not familiar with the contraindications. It is highly important to know when not to use it. A keen appreciation of its dangers and the unfortunate sequelæ which have thus far caused considerable prejudice against the method will enable us to avoid its use in certain instances where they are liable to occur. Its wonderful possibilities will then overshadow the disadvantages, and when trouble is encountered the operator will be able to charge it to his own shortcomings and *not* to the method.

Contraindications.—In the presence of low blood pressure, spinal anesthesia should be used with great care, on account of the complete vasomotor relaxation that follows its use. A blood pressure of less than 100 is a strong contraindication, as a rule, and it should not be used in patients whose heart muscle is so damaged that it cannot stand a sudden and severe fall in blood pressure. It should be used with caution in patients in profound shock or where there is exhaustion of the spinal centers. It is difficult to resist the temptation to use this form of anesthesia, occasionally, in some nearly moribund patients and, unless one is extremely cautious, the results may be disastrous. It is, perhaps, here that accidents most often occur. Unless strongly indicated, it should not be given to patients who are extremely nervous, because if convalescence and recovery are not ideal, they may attribute the symptoms to the method of anesthesia, when it has had no influence whatever. Patients giving a history of habitual headaches, should be excluded from this form of anesthesia. The presence of syphilis does not contraindicate its use, but it is well to inform the patient that any disturbances of the nervous system which may develop in the future are due not to the anesthetic but to the disease itself.

Indications.—Spinal anesthesia, as applied to the work of the gynecologist, has its chief value when used in conditions where the risk is increased by the additional shock imposed by any form of inhalation anesthesia. This is true always when complete muscular relaxation is desired and where the shock and hemorrhage are likely to be severe. Shock is reduced to the minimum and is infinitely less than under any other form of anesthesia. Hemorrhage is less because of the lowered blood pressure. It is valuable in operations upon patients having pulmonary tuberculosis, in abdominal hysterectomy for cancer of the uterus, where shock is always quite severe and where complete relaxation of the muscles is necessary, in the removal of fibroids complicated by dense adhesions, or in chronic infection of the Fallopian tubes associated with dense adhesions, where the shock incident to trauma and hemorrhage is always severe. There are many instances where it is less dangerous than ether, and its use is logical in bad cases which are not complicated by other organic or systemic disturbances. This is true especially in certain cases of acute peritonitis and in severe toxemias of pregnancy where the necessity arises for emptying the uterus.

Advantages.—It is a form of local anesthesia in which the greater part of the poison is deposited around the site of injection, and is

thus rendered harmless. In ether or chloroform narcosis the poison circulates widely and pronounced toxic effects occur.

Shock is reduced to a minimum. The postoperative recovery is made much more comfortable in every way. Vomiting occurs but seldom. Owing to the absence of vomiting and restlessness, the pain is much reduced. The patient is less nervous because of the absence of shock, nausea and postoperative pain. The greatest advantage is the absolute muscular relaxation which follows its use. Operative procedures, which are usually difficult under inhalation anesthesia, are greatly facilitated.

Untoward Effects.—Eden Rehn and others agree that the usual doses produce no degenerative changes in the spinal cord, and that they have no injurious effects which are permanent.

Sudden Deaths.—Accurate technic and painstaking care in the selection of the patient for this form of anesthesia will place it among the safest of anesthetics. One not prejudiced against the method at once questions the technic in reports of immediate death. It would seem desirable that such reports be accompanied by a complete history and report on the physical examination of the patient together with an accurate description of the technic. In a study of deaths reported, one is convinced that the vast majority of them occur among patients who should not have been subjected to this form of anesthesia; or, perhaps, not fit subjects for operation under any method of procedure. We must remember that as yet there is no form of anesthesia that is absolutely safe.

Headaches.—Operators have reported quite a large percentage of headaches. It is more common among neuropathic individuals and those prone to headaches on slight cause. In our experience, the number of cases of headache have grown progressively less as we have grown more familiar with the method. Babcock is of the opinion that headaches are due to the use of solutions which are not pure, and in his service, when headaches appear, the solution is immediately changed. *Backache* has not occurred oftener than with other forms of anesthesia.

Albumin, casts and *acetone* have occurred less frequently than in a similar number of cases following ether. Vomiting as a result of acidosis is also less frequent. Paresthesia and neuralgias of the lower extremities are doubtless due to bad technic. Ocular palsy occurs occasionally and, as far as can be determined from the literature, they, too, are most likely to occur in the nervous individual. Babcock believes them to be caused by deteriorated solutions. Few cases have been reported as compared to the total

number of administrations, and the majority have been but temporary.

We have not found it necessary to *use the catheter* oftener than with other methods.

Novocain has been used in our work. A 10 per cent. solution is employed; the amount varying from 1 to 2 c.c. The site of injection depends upon the extent of the field of operation. For vaginal work it is given in the fourth lumbar interspace. Experience is necessary to obtain satisfactory results. Headaches and other unpleasant sequelæ are much less frequent as one becomes familiar with the technic. In the first hundred cases, ether will be used because of incomplete anesthesia in 10 or 15 per cent., but after that the necessity for its use rapidly decreases.

Conclusions.—Spinal anesthesia is the best anesthetic known today for certain operations in the lower abdomen. It should be given only after careful study of the patient. Our experience indicates that, if spinal anesthesia is not properly employed by one possessing sufficient clinical skill, it may have a large mortality. There is no form of anesthesia which is altogether free from danger, either immediate or remote. There are well-defined contraindications to the use of all anesthetics in certain instances, and it would seem that we have reached the place where the operator must exercise considerable judgment as to which anesthetic should be employed in a given case.

REFERENCES.

Gellhorn. Local and Spinal Anesthesia in Gynecology and Obstetrics. *Journal A. M. A.*, Oct. 11, 1913, vol. lxi, page 1354.

Connell. Apparatus for Measuring and Fixing Anesthesia and other Vapors and Gases. *Surgery, Gynecology, and Obstetrics*, August, 1913, vol. xvii, page 245.

Connell. Accuracy in Anesthesia. *Annals of Surgery*, December, 1913, vol. lviii, page 877.

Connell. Nitrous Oxide—Oxygen Dosage in Anesthesia. *American Journal of Surgery*, Jan., 1915, page 39.

Babcock. Spinal Anesthesia in General Surgery. *Medical Record*, 1915, vol. lxxxvii, page 288.

Babcock. The Usage and Limitations of General Anesthesia as Produced by Subcutaneous and Intravascular Injection. *Monthly Cycle and Medical Bulletin* 1912, vol. v, page 1.

Babcock. Spinal Anesthesia with Support of Surgical Clinics. *Surgery, Gynecology, and Obstetrics*, Nov., 1912, vol. xv.

Babcock. Spinal Anesthesia in Gynecology, Obstetrics and Abdominal Surgery. *Journal A. M. A.*, Oct. 11, 1913, vol. lxi, page 1358. This article and Dr. Gellhorn's are published together with a discussion.

DISCUSSION.

Dr. Hugo O. Pantzer, Indianapolis, Indiana.—Great variability of physiological effect pertains to every drug. This might be figuratively expressed by saying the normal effect from any drug is obtained in only about 80 per cent. of cases. In the remaining 20 per cent. the effect is all the way from indifferent to poisonous. It is this general attribute as pertaining specifically to narcotics and anesthetics which makes the difficulty of selecting or adjusting the usefulness of an anesthetic.

I have been very much interested in the paper of Dr. Huggins, and I shall follow up with sympathy greater than before the subject of spinal anesthesia. I have used for six years, and still use, H. M. C. tablets formerly followed by chloroform, more latterly by ether. I give one H. M. C. tablet two hours, and a second one about forty minutes before beginning the ether. The second tablet is never given until the house physician has seen the patient and assured himself that there is no evidence of hyoscin idiosyncrasy. If such is found, the second dose is not given. I very rarely have shock after even prolonged operations. An operation for carcinoma of the uterus even in an aged woman, I no longer fear. These aged women seem particularly happily affected by H. M. C. The amount of ether narcosis given additionally in most cases is surprisingly little, and not followed by shock. These patients waken after three to six hours oftenest with smiling faces and at once ask when they may have something to eat. This is no exaggeration. For my part, I will hold to the H. M. C. tablets followed by ether, until further convinced their effect has been superseded by other drug or drugs.

Dr. O. H. Elbrecht, St. Louis, Missouri.—I have been making use of spinal anesthesia for about eight or ten years. I took it up at about the time Jonnesco came to this country and exploited it, and was successful in producing a wave of spinal anesthesia in America. I read a good deal of the literature put out by him and was rather skeptical about it. I had a talk with Dr. Morris about it. My first work was done with stovain. The dangers that accrue from it as a result of its use are just a little different from those incidental to the use of respiratory anesthetics. The first signal you get is a respiratory failure with a far greater warning than you get from the respiratory anesthetic, in that you will find the respirations coming on, and if you work long enough you will bring them around. It has no effect on the heart except in a secondary way, which is brought about by failure of respiration. The first thing that happens to you is you get scared, but it is the same with these patients as it is with drowning people, if you work on them long enough you will bring them back.

The best and most comprehensive chapter on Spinal Anesthesia with which I am familiar is that written in the System of Surgery by Barker who was one of Bier's assistants. In the earlier use of these anesthetics he gave Bier an anesthetic, and Bier gave an anes-

thetic to his assistant. They soon realized the toxicity of this and swung to the less toxic anesthetics, and they began using betaeucain. I think spinal anesthetics are sifting down to the use of novocain. Jonnesco has proved that it is safer in combination with strychnin. You can make the combination up yourself. You can sterilize the strychnin and make up the solution, making 2 c.c. of fluid. There is no question but what it is a safe anesthetic, but as Dr. Huggins has brought out, you must study the patient. A patient who faints when you lance a carbuncle will go wrong on the operating-table when you use spinal anesthesia. I have had patients where amputations could be done with perfect indifference so far as the patient was concerned, because they were assured at the start they would have no pain and they were a type of patients who were anxious to see the operation, so to speak. I operated on a case of extensive umbilical hernia under local anesthesia, and lifted the stomach up and showed it to the patient. What influences the patient's mental attitude toward the anesthetic has to do with spinal anesthesia more particularly than with local anesthesia because when you get the patient on the operating-table, and get him under the influence, in a few minutes he feels that he cannot lift his leg and feels he is paralyzed for good. These features can be overcome by a little Christian Science and by encouraging the patient to respond. If you cooperate with the mental attitude of the patient you will have less trouble with spinal anesthesia. I have done gastroenterostomies and gall-stone operations with it, but every now and then you get a patient who will go all to pieces on the operating-table because he is so sure he has got it down pat.

One thing I want to warn against is the contraindications. I have lost two patients in whom there was intestinal obstruction. I selected spinal anesthesia the first time because the patient was an unfavorable subject who had pronounced stercoraceous vomiting, and I felt this anesthetic gave a better chance to avoid fecal drowning, but I got fecal drowning just the same. I do not think the anesthetic will be the means of causing less vomiting than any other anesthetic you may use. I think it is easier because of the mental attitude of the patient.

As to the headache that is an interesting feature, and Dr. Huggins thinks it was due to faulty technic. We withdraw 2 c.c. of spinal fluid by measurement, and then using a syringe introduce 2 c.c., giving the patient exactly the same amount of fluid as we have withdrawn. The change of pressure does not seem to do it any more than when you have a man in your office and you do a lumbar puncture in order to do a Wassermann of the spinal fluid. What is it? Is it a change of pressure that causes the man to complain? In a Wassermann you take far more fluid out of the spinal canal than you do for spinal anesthesia. You take out 5 or 6 drams. Why is it? Did some of it escape? If it is a question of change of pressure, the amount of fluid withdrawn should do it, but it is not. If you put back the same amount that you have withdrawn, you know you have not changed the intraventricular pressure one bit. I have

seen those headaches last for eight days straight, and nothing but big doses of morphin would relieve them.

There is one point in connection with chloroform I want to bring out. I was interested in hospital work a few years ago where they used ether, but they are now swinging back to chloroform. In two surgical clinics they are using chloroform straight without and with carbon dioxid. In one clinic they are using chloroform with carbon dioxid. They feel they are overcoming the dangers of chloroform by this fine vaporous spray of chloroform plus the carbon dioxid. I saw a patient with intestinal obstruction who was kept under the anesthetic for one hour and thirty minutes on 1 ounce of chloroform, sprayed in that way, with the patient as perfectly flat as under ether anesthesia without any preparatory preparation. The carbon dioxid stimulates respiration.

Dr. G. Van Amber Brown, Detroit, Michigan.—My first case of spinal anesthesia came about thirteen years ago, and it was the last kind of a case in which one should think of using spinal anesthesia. The patient was a five-year-old child. It was contraindicated on account of a low blood pressure which we find in children. One of the beauties of spinal anesthesia is that it is indicated where general or inhalation anesthesia is contraindicated.

Too, the essayist spoke of the abdomen being soft. That is true, usually, but the trouble is that frequently it is just the opposite. When it is not true, you have a bad abdomen because 5 per cent. of the spinal anesthesias are followed by vomiting, and abdominal rigidity, when it is an abdominal case you cannot go on with your work. In 5 per cent. of the cases your spinal anesthetic will not act, and the patient should be instructed accordingly before you attempt to anesthetize her with the spinal method, and be prepared to go on and give a general anesthetic, because ether is not a contraindication where you have previously given a spinal injection.

The headaches are, as the last speaker just remarked, occasioned no doubt by low blood pressure. We should bear in mind that the coal-tar derivatives are contraindicated and we should give something to raise blood pressure.

With regard to the safety, I happened to be in the Bier clinic when Bier was able to report his results in 4000 cases of spinal anesthesia by tropacocain. Previous to this he had used stovain, and the accidents were so numerous that he abandoned its use. Of the 4000 cases in which tropacocain was used there were only two deaths, one in which a mistake was made by giving a double dose. The other by giving the wrong drug. Such a report I think speaks very well for the safety of tropacocain anesthesia.

Dr. Samuel W. Bandler, New York City.—While I am not actively using this method myself, I have for several years at the Post-Graduate Hospital watched Dr. Boldt who has been an advocate of this method, as you all know, particularly in cases of carcinoma. I have followed these cases with him and watched them, and have noticed the results. In a number of cases the abdomen is not soft, but is rigid, and ether has to be given in addition to the other anes-

thetic. That is an additional shock. In the latter months he has adopted the method of giving morphin and scopolamin before resorting to intraspinal anesthesia, and that went much better, but in spite of that it was necessary to add on a little ether, and I think we all agree it is giving the patient much more ether morphin and scopolamin and spinal anesthesia than he or she should have. So I believe that Dr. Boldt is not quite as enthusiastic about the method except in the urgent cases of carcinoma as is Dr. Huggins. Watch these cases in which you give morphin and scopolamin and spinal anesthesia, and when they go to bed their condition is not such as to give much joy. They are almost dead to the world. They suffer from headaches; it takes them a long time to get back to the normal.

The method of anesthesia we use in the largest number of cases—and we have on an average thirty major operations a day—except where there are contraindications, is ether by the open method, and recently they have introduced the Montgomery apparatus. It acts by means of a gas arrangement. There is a certain amount of pressure in the bottle; a mask a little different from the ordinary chloroform mask is put over the patient's face and by means of a stop cock you can regulate the number of drops per minute. The ether is given by that method. Ether at the Post-Graduate Medical School is not given by the house staff but by nurses who are trained to do that work, some of whom must have given anesthesia to at least 2000 cases. They do it in cases of all sorts for all surgeons. I wish to say, that practically all of us have for some years given $\frac{1}{6}$ of a grain of morphin, $\frac{1}{150}$ of a grain of atropin and $\frac{1}{150}$ of a grain of scopolamin an hour before the anesthesia is administered. We find it works beautifully, and it ends without shock or annoyance to the patient.

Recently nausea and vomiting have been obviated by adopting the following principle: Every patient on whom a laparotomy or other major procedure is performed, as soon as she gets back to bed, is not given a thing by mouth for forty-eight hours. She is put on the Murphy drip and, whether she is in a normal condition or not, she gets 1000 c.c. of tap water, with twenty drops of adrenalin in it, or 1000 c.c. of normal saline per rectum. Every three hours or every six hours, as necessary, $\frac{1}{8}$ grain of morphin, $\frac{1}{150}$ grain of atrophin are given and those who have followed the progress of anesthesia in their own cases by this plan say it is a positive pleasure.

I would like to make the assertion that there will not be one patient out of fifty who has nausea or vomiting when this method is followed. So if you give ether by the method spoken of, with a little morphin and scopolamin beforehand, and give tap water, you will have no shock. You have no nausea and vomiting; you have no headache, and after all, it gives satisfactory results in 90 per cent. of all cases as they come along.

While the spinal method of anesthesia has its indications in a certain class of cases, and we must listen to a man of Dr. Huggin's eminence, who tells us it is the quickest and most ideal anesthetic

he has found, yet I believe the old method of which I have spoken is about as good as anything that has yet been discovered.

Dr. Charles L. Bonifield, Cincinnati, Ohio.—I cannot resist the temptation to talk on anesthesia for just a minute, because I want to say something that I am sure none of you will say.

In the first place, I was interested in what Dr. Elbrecht said about giving the patient carbonic acid gas with the chloroform. I do not propose to argue the method of giving ether; I will do that on some other occasion when I have plenty of time to take it up. But as a preliminary to my remarks I will state that I have ether administered by the old-fashioned closed method, and my reason for doing it is that I have witnessed the administration of anesthetics all over this country and in Germany, and have never seen as nice anesthesias as are secured by giving ether in this way. So my anesthetic is ether always given in the old-fashioned way. There are two reasons for that: the ether is warmed by being in a cone, and secondly, we can regulate how much of the carbonic acid gas we get, and carbonic acid is a reliable stimulant for respiration. In using this method sufficient cotton is put in the cone to retain about 3 ounces of ether and leave a considerable space in the cone for the accumulation of ether vapor. Three ounces is poured on before the beginning of anesthesia so that there be no occasion to add fresh ether during the first half hour. This prevents irritation of the air passages and enables the anesthetist to crowd the anesthetic just at the moment crowding is advisable.

The majority of people give ether by the drop method. They seem to prefer to swim with the tide and as drop ether was brought to us from across the water, they think it must be an improvement, though they cannot tell you why. Naturally I have a few disciples. Among them is a general surgeon, Dr. W. E. Savage, who many years ago was an interne of mine. Dr. Savage observed when he was my interne that I sometimes operated on cases of tubercular peritonitis, and did not do anything but open the abdomen and close it up and the patient got better. He was not satisfied with any explanation of this result that I could give him. Later he opened an abdomen for tubercular peritonitis and found the intestines and omentum so closely adherent to the abdominal wall that he deemed it unwise to separate them. This case did as well as the others he had seen. He reasoned from this that it could not be the admission of air into the peritoneal cavity that had the beneficial effect and that there were only two things left to explain it. The incision and the anesthetic.

He thought it more probable that the anesthetic was the therapeutic agent and tried giving the patient ether by the closed cone method and found they did as well as though he opened the abdomen. This led him to try it in advanced cases of pulmonary tuberculosis. I, myself, had the pleasure of seeing one of his cases who had entered the hospital with a rapidly progressing lesion of the lungs. His temperature was 103, pulse 120 and he was absolutely unable to take food. Forty-eight hours after an ether anesthetic his tem-

perature dropped to normal and he was eating substantial food with relish and showed every evidence of improvement.

Dr. Huggins spoke of tuberculosis of the lungs as a contraindication of the use of ether. Dr. Thad. Reamy used to tell his patients if they were suffering from a mild bronchitis, ether would cure them. His experience and that of Dr. Savage would seem to indicate that tuberculosis of the lungs is not a contraindication to the use of ether.

There is one other point I wish to make. I believe it is one of the greatest importance if we give chloroform or ether, to make it a routine practice to alkalinize the patient's urine before the anesthetic is given. To alkalinize the urine it is necessary to give alkalies in small doses frequently repeated in large quantities of water. It cannot be done by administration of large doses because they will not be absorbed. It usually takes thirty-six to forty-eight hours to render the urine alkaline. If you do this you are counteracting the acidosis which is really the poison that these anesthetics produce.

Dr. James E. Davis, Detroit, Michigan.—There are one or two points that occur to me in connection with this paper and discussion. In the use of spinal anesthesia you administer a definite quantity at one time, and you cannot vary it. With ether or chloroform you vary the amount of the anesthetic according to the findings at the operation; also with ether or chloroform you can vary the depth of the anesthesia, but this cannot be done with spinal anesthesia. There is an important point in guarding the length of time the anesthetic will be given and also another in giving the anesthetic according to the requirements of the case. Where some injury is being done, and where pain is being caused, the anesthesia ought to be deeper. Where there is very little tension the anesthetic can be varied and very little need be given. These are important advantages in favor of the anesthetic given by inhalation.

Dr. Rufus B. Hall, Cincinnati, Ohio.—I have been very much interested in the paper of Dr. Huggins, and I think the profession is very well united on the fact that there are individual cases in which spinal anesthesia is desirable, but I do not think the profession to-day is united at all or is willing to make it a routine practice. We may come to that, but for the reason stated by the last speaker, it will take a long time to overcome the prejudice in the human mind that we must give a maximum dose and we cannot get rid of it, if anything should go wrong that would be against it. No doubt prejudice would have to be overcome by experience. I am free to say, that I have had no personal experience with this form of anesthesia, and so far as my results are concerned, I would not want to say anything in depreciation of this paper or the method advocated, but I do want to emphasize what is now recognized to be a very important clinical fact, that a person who is specially equipped, both by temperament and experience, is a very great and safe factor in the administration of anesthetics. I was among the first men in the country to employ a special anesthetist. In 1888 I employed a special anesthetist. From that time to the present I have had my fourth man only to give anesthetics. Not in that period have I operated without my

special man to give the anesthetic as many times as there are fingers on one hand. I am perfectly willing to do emergency operations if I can only get the assistance of helpers and nurses without much experience, but I want my man to give the anesthetic. It is a safety to the patient and advantage to the operator, and I think a great many men now follow that plan.

When an operator is working every day he becomes accustomed to a certain plan, to a certain anesthetic, and to a certain routine of giving the anesthetic. He separates and selects his cases, or should do so, and does not give the same anesthetic to all patients. He should know the contraindications, and should select the anesthetic for the individual patient. That is a safe working rule. For fifteen years the usual anesthetic given in my work was chloroform. Every one else had been administering ether a long time before I took it up. I went to ether, I wrote a paper on the subject and gave my reasons for its use. I did not have a lot of deaths from chloroform, and that was not the reason I gave it up. I am still giving chloroform occasionally, and we give ether and even local anesthesia. I have not tried spinal anesthesia, but I am convinced that there are cases in which spinal anesthesia can be employed to great advantage by the surgeon. I am sure, there are cases where it would be a distinct advantage to use it, but it is not worth while to experiment with it. It must be given systematically as Dr. Huggins has pointed out.

Dr. Zinke.—Why did you quit chloroform?

Dr. Hall.—On account of the bad effect it had on the kidney secretion and to the liver.

Dr. Huggins (closing the discussion).—I appreciate very much the free discussion given my paper. Dr. Pantzer spoke about narcosis anesthesia. I would like to ask him if he has had difficulty in securing good anesthesia when it has been necessary to supplement the use of morphin and scopolamin by giving ether owing to slowing of the respiratory rate.

Dr. Pantzer.—In the rarest cases only, Doctor.

Dr. Huggins (resuming).—I do not want to give the impression that I have too much assurance in the use of spinal anesthesia. I believe that it has a place in gynecological operations and that every operator doing pelvic work should become interested in this form of anesthesia and at least consider it from an unprejudiced viewpoint. Every anesthetic has its contraindications. There is no doubt that spinal anesthesia has its contraindications and for that reason should be given only by the operator after most careful study of the patient. There is no question that we do have a certain percentage of headaches—no one has been able to tell us why. We sometimes get headaches after the withdrawal of the spinal fluid. It may be the effect of the drug but as to that we are not sure. We have headaches after ether and after every form of anesthesia. In intestinal obstruction patients are desperately sick and if ether or chloroform are used and the patients die nothing is thought of it but if spinal anesthesia is given and death ensues, the anesthetic is condemned.

Reference has been made to the condition of these patients after they leave the operating room. This is one of the advantages of spinal anesthesia. The contrast between the postoperative recovery of these patients as compared with those who have had ether is quite marked. There is seldom any trouble from vomiting, the patients are quiet and comfortable and postoperative distention is much less and there is no shock.

Dr. Hall.—In abdominal operations, I would like to ask you whether the abdominal muscles are relaxed more than they are under ether?

Dr. Huggins.—The abdominal muscles are absolutely relaxed. Dr. Bandler has evidently seen poor spinal anesthesia. If it is properly induced, there is complete relaxation of the abdominal muscles. After using spinal anesthesia one dislikes to go back to the inhalation method for this reason.

Dr. Hall.—May I ask you another question? Supposing you were operating for extirpation of the uterus for cancer and you wanted to make a wide dissection, can you put the patient in the Trendelenburg position safely?

Dr. Huggins.—Yes. That is why we use alcohol in the solution thus making it lighter than the spinal fluid. When this is done raising the hips causes the fluid to be carried downward, that is, toward the bottom of the spinal canal. We use ether in our general routine service but we believe spinal anesthesia is worthy of careful trial and unprejudiced investigation.

COLLOIDAL SILVER IN SEPSIS.

BY

G. VAN AMBER BROWN, M. D.,

Detroit, Mich.

It is a well-known fact that during immunization specific protective bodies are formed, which circulate in the blood and furnish protection against infection or intoxication by neutralizing toxins and destroying bacteria, or preparing them for ingestion by phagocytes. The serological era brought us different seras intended to provoke these actions in another organism.

The sera which were made only for their antitoxic action have given the greatest success, but the bacteriolytic sera failed. Their katabolic action in destroying bacteria was successful; but in destroying them the endotoxins of the bacteria were liberated and the serum failed to neutralize the endotoxins. Hence these sera have been disappointing. All experiments to obtain an immunization against the toxins have failed, so that Wolfe-Risner has claimed it to be impossible. Wassermann explains this failure by the inability to fit amboceptors. The amboceptors are increased during immunization, but the complement remains the same. Since amboceptors without complement remain inactive, even the strongest serum is only slightly effective, in accordance with its complement contents. With the streptococcic immunization sera the inefficiency of the curative effect is sufficiently shown by the numerous methods by which different serologists have endeavored to obtained a perfect serum. The serums of Marmorek, of Aranzon, of Menzer, or of Meyer-Ruppel have not served their purpose in puerperal fever.

Lavern showed that arsenious acid will destroy trypanosomes in the blood. By a study of the trypanosomes and spirochetes Paul Ehrlich introduced a new phase into therapeutics: chemo-therapy in contradiction to pharmaco-therapy.

In the different kinds of sepsis silver is a well-known therapeutic factor; but silver has a great tendency to enter into insoluble combination with the chlorides and phosphates of the blood plasma, which minimizes its antiseptic effect. In 1897 König showed experimentally that the antiseptic action of different salts of equal molecular concentration differed according to the degree of dissocia-

tion. The more dissociated a solution the greater its antiseptic activity.

Since Lenard discovered the *x*-rays the study of them by Röntgen and his co-workers, together with the study of the emission of rays from certain metals, has introduced a new theory into physico-chemistry known as the electrionic theory. According to this theory the atoms are not the ultimate fractional parts of the molecules, they are only theoretically there. Each atom is composed of several hundred electrons. The hydrogen atom, for instance, has about 800 electrons, each of which is charged with electricity. Whenever a compound goes into solution its molecules are changed into ionized atoms. In every electrolite there is a perpetual movement of the ions in indefinite directions. When an electrical current is sent through a solution it converts more of the molecules into ions and they become definitely directed in their wanderings, each ion possessing an electrical charge.

Mercury as a germicide gives a good example of ionic activity. If we study mercuric iodide and mercuric bromide, each containing the same amount of mercury per volume, we find they have a different activity upon living bacteria. It is the individual ionic state which is important and not the quantity of mercury.

Laboratories have prepared by electrolysis a colloidal silver called electrargol. Electrargol is heterogeneous including two essential parts, a liquid medium and solid particles. The solid particles are seen only by the ultramicroscope on a dark ground, as a multitude of (0.1–0.01 mikron) particles moving in the solution, each of these having an electrical charge. Every ion has its own antiseptic power, hence the electrargol combined by these particles represents a larger surface of antiseptic power than other colloidal salts of silver.

What do we expect from an ideal general antiseptic? First, a real and complete katabolic action on bacteria and, second, a protecting influence on the body by stimulation of leukocytes to phagocytosis. From this viewpoint electrargol is ideal.

We obtained virulent streptococci from Parke Davis, made cultures in ascites bouillon, putting five drops of electrargol into each tube. No growth was obtained. We sprayed electrargol onto a growth of bacteria on ascites agar. We transplanted the islands which came in contact with electrargol and those which did not. We obtained growth in our cultural tubes from those that did not come in contact with electrargol spray, but no growth from the others.

As to the stimulation of leukocytosis, we injected rabbits with half c.c. electrargol. The white blood cells raised from 6000 to

10,000–13,000; the polymorphonuclear leukocytes from 50 or 60 per cent. to 80 or 90 per cent. It is interesting to show that twelve hours after injection there appeared a slight leukolysis (7000 to 6600) but after twenty-four hours the high leukocytosis always appeared.

We used in the following line of experiments 4-pound rabbits and bacteria of uniform virulence. Two classes of animals were studied, those injected with virulent streptococci and those protected by injection of electrargol and later injected with streptococci. Only one animal from each class is noted in this report since each is a fair illustration of what happened to every animal treated.

Rabbit A.—Four pounds. Temperature 96. Leukocyte count 6600 with 34 per cent. polymorphonuclears. Injected with ½ c.c. streptococcus emulsion intraperitoneally. Next day quiet, ate normally, temperature 96.4, leukocyte count 15,000 with polymorphonuclears 76 per cent. After three days restless, leukocyte count 17,000, temperature 102. Blood culture shows streptococci. Dies after seven days.

Rabbit B.—Four pounds. Temperature 96.5. Leukocyte count 8000 with 43 per cent. polymorphonuclears. Injected with 3 c.c. of electrargol. Twelve hours later injected the same amount (½ c.c.) of the same streptococcus emulsion as in rabbit A. Remains quiet, acts normally. Next day leukocyte count 10,000 with 60 per cent. polymorphonuclears. After forty-eight hours blood culture did not show any growth. After seventy-two hours rabbit is lively, developing no symptoms of sickness. Leukocyte count 9000, animal remains well.

So we see, *in vivo as in vitro*, that this colloidal silver possesses the requirements demanded in a chemical general antiseptic. Electrargol does not go into insoluble precipitate either with the albumins or with the chlorides of the blood plasma, hence its effectiveness antiseptically is retained in the blood stream. Being a colloid it does not, like a crystaloid, pass through animal membrane by dialysis which would permit of its rapid elimination, but remains long in the tissues performing its antiseptic duties.

We noticed in our patients treated by electrargol another important point. The temperature rises three to five hours after administration. This we believe shows that, after destroying the bacteria, the toxins are liberated into the blood stream and, as foreign albumins, cause the intoxication, this being soon overcome by the action of the drug.

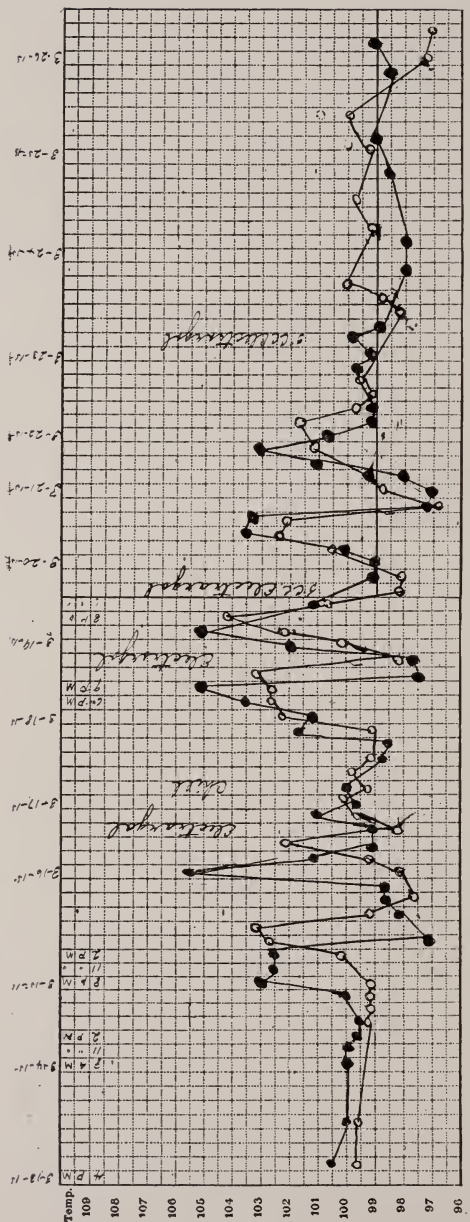
Colloidal silver has, as we know, been used in septic cases before now, and there is much literature on the subject. Collargol differs

from electrargol in that it is a chemically made colloid silver, while electrargal is obtained by electrical means; that is, by passing an electrical current through the solution, causing the ions to wander in the solution according to strict physical laws which allow each ion separately to accomplish its germicidal and fermentative action.

Electrargol, in the last few years, has been much used in different septic conditions; not however, so far as I know, in the bacteriemias. Here the results are very satisfactory. Let me cite some of our own cases which were with one exception treated in Providence Hospital.

Case I.—Referred by Dr. George, who later reported to me the following: G. L., pattern-maker. English. March 16, 1915, received slight scratch on dorsum of little finger of left hand. He consulted me the next day with a developing lymphangitis. Glands in the axilla slightly enlarged and tender, headache, etc., had had a chill. Finger was dressed with alcohol and boracic acid and ice-bag applied. On the 21st, pulse 84, temperature 96, respiration normal. On the 22nd, another chill, pulse 120, temperature 102. Finger was incised, the dressings renewed. A scarlatinic rash made its appearance on the face, neck and chest. Headache intense, complained of dark spots before the eyes. No delirium. On the 23d, A. M., pulse 100, temperature 100; 3 P. M. had another chill, pulse 118, temperature 102.3. The rash had extended over the remainder of the body. On the 24th, A. M., pulse, v.a. 105, temperature 101. He was seen at noon in consultation with Dr. Brown; at 3 P.M., 5 c.c. electrargol was administered intravenously, pulse 120, temperature 103, at 6 P. M., pulse 135, temperature 104. 25th, A. M., pulse 110, temperature 100, headache had disappeared; decidedly better condition, P. M., pulse 100, temperature 101. 26th, A. M., pulse 100, temperature 98.8; P. M., Pulse 100, temperature 99.7. 27th, noon, pulse 60, temperature 98.8. The rash had faded. Desquamation had begun—the epidermis of the hands and feet peeling off in large casts conforming to the shape of the fingers and toes. April 5, able to visit me at my office and said he felt able to go back and do light work. April 6, I was called by his mother, who said he had caught a severe cold. He contracted an influenza which kept him in bed for several days. He recovered and is, at present, in good health.

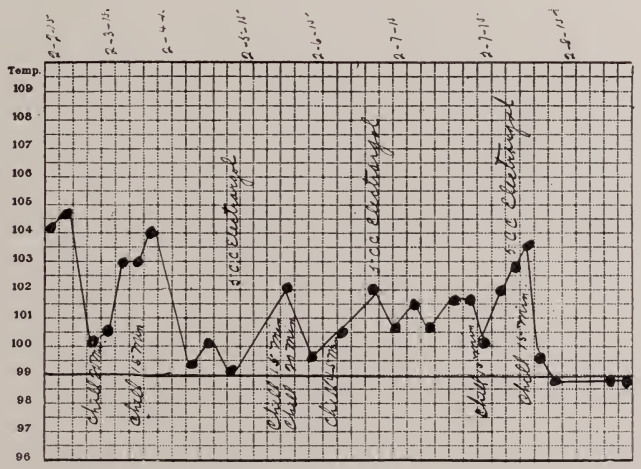
Case II.—Referred by Dr. Meddaugh. Mrs. G. S., aet. twenty-five, housewife. Previous history had nothing of importance. Was confined March 8. On the sixth day, her temperature went up to 100, she was restless, pulse 100, respiration 30. She was admitted into hospital March 15. Temperature suddenly rose to 104, pulse 130, respiration 30, leuokcyte count 13,000 with 83 per cent. polymorphonuclears. In the afternoon she had a chill lasting thirty minutes, another chill at 6 P. M., and another at 10 P. M. Temperature rose after last chill to 106.2. Delirious during the night. On the 16th, she had three chills during the day, each lasting from twenty to thirty minutes, temperature 106.8, pulse 130, respiration 30.



CASE II.

Very cyanotic, restless and delirious. Cervical smears showed streptococci and staphylococci. Treatment only local douches and bromides. On the 17th, electrargol, intravenously, 5 c.c. at 10 A. M. Temperature dropped to 99. On the 18th, chill lasting thirty minutes. Temperature rose to 105, pulse 130, vomiting, perspiration, rash appeared on extremities. On the 19th, electrargol, intravenously 5 c.c., temperature 106, pulse 130. At six o'clock in the morning, temperature suddenly dropped to 97, pulse, 60. On the 20th, electrargol intravenously, temperature rose to 104, pulse 140. After four hours, temperature dropped to 100. Patient still irrational, but no chills. 21st and 22d, no chills, temperature varied from 97 to 102, headache but quiet. 23d, electrargol, intravenously, 5 c.c., temperature 100, pulse 60, respiration 20. 24th, temperature 98, pulse 90, respiration 20, slept well, no rise of temperature. She left the hospital March 28, sixteenth day.

CASE III.—Referred by Dr. Haverstock. This case is of interest, because of the exact data of the temperature and pulse after electrargol injection.

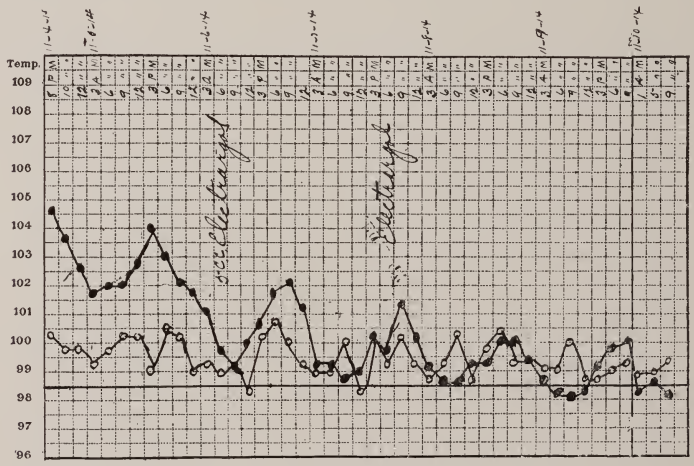


CASE III.

Mrs. S. Septic after abortion. Temperature varied between 98 and 105. Staphylococci found by cervical culture and pure streptococci in the blood. She suffered from acute nephritis and acute hemiplegia. Desperate case without any hope. Resistance of the patient on admittance so low that leukocyte count was only 5000 but 90 per cent. polymorphonuclears. Chills every hour, unconscious. The patient could not be saved, but the electrargol injections stopped the chills for forty-eight hours. Previously Van Cotti's vaccine raised the temperature from 102 to 104. Electrargol, intravenously, had following effect: Given at 10.30, temperature 101, pulse 120; 11 o'clock, temperature 102, pulse 120, res-

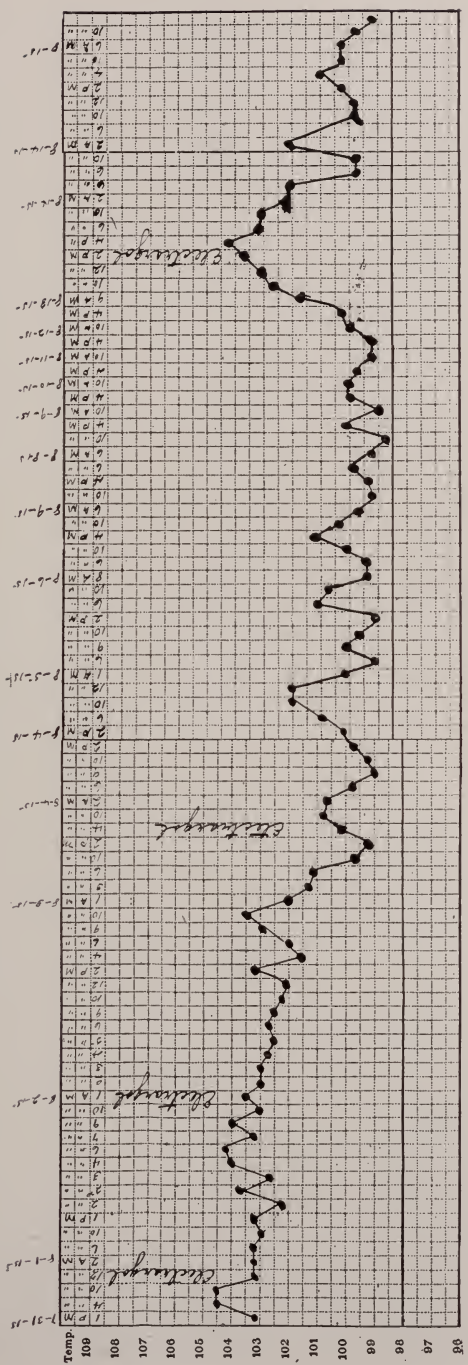
piration 24; 12 o'clock, temperature 101, pulse 100, respiration 22; 1 o'clock, temperature 100, pulse 98, respiration 24; 2 o'clock, temperature 100, pulse 94, respiration 22; temperature remained for the next twenty-four hours under 101; again, temperature 104, pulse 130, respiration 30. Electrargol 5 c.c., intravenously, 10 A. M. 11 A. M., temperature 102.4, pulse 110, respiration, 24; 12 M., temperature 102, pulse 108, respiration 24; 1 P. M., temperature 101, pulse 100, respiration 22; 6 P.M. same; 10 P. M. same.

Case IV.—Polish woman, aged nineteen, small in stature. After a prolonged labor, she was instrumentally delivered of a 12½-pound boy. She was torn through the rectovaginal wall nearly up to the cervix. A few days later she developed chills and fever. When admitted to the hospital, her temperature was 105, pulse 130. She was delirious and had no remembrance of her first four weeks in the



Case IV.

hospital. During the first eleven days she was on another service where the usual treatment was carried out. Her condition was desperate. Temperature varying from 98 to 106, pulse 80 to 135. Through the courtesy of the other service we were permitted to try colloidal therapy. Examination: General appearance one of exhaustion. Skin light lemon color with brown spots. Facies septic. Mind a blank. Localized findings negative, other than vaginal injuries. Temperature 104, pulse 90. Culture from cervix showed colon bacillus and a streptococcus, culture from blood staphylococcus aureus. Leukocyte count 9600. Two days later, 9 A. M., temperature 99; pulse 90. Injection electrargol 10 A. M., at noon temperature 102, pulse 105. Next day, temperature 100.8, pulse 100. Injection of electrargol at 12 M., temperature 101.7, pulse 100. Never again above 100. After forty-eight hours the temperature remained normal. Two weeks later the vaginal injuries were repaired, healing



CASE V.

by first intention. She made a splendid recovery, leaving the hospital four weeks later in good physical condition. She lately reported that she is several months pregnant.

Case V.—A very interesting result was obtained in the following case, referred by Dr. H. W. Yates. Polish woman, aet. twenty-five. Was admitted to the hospital on July 31, the ninth day after confinement. Temperature 104, pulse 130, respiration 40. Dry tongue, septic facies, restless, leukocyte count 15,000 with 97 per cent. polymorphonuclears. Quinine and brandy had been given every three hours. August 1, temperature 104.4, pulse 120, respiration 30. August 3, electrargol 5 c.c., intravenously, temperature dropped to 99, pulse 110, respiration 24. The next day temperature remained 99, but patient was more comfortable and resting, tongue moist. After a week the leukocyte count was only 6700 showing the prompt effect on the infection by elevation of the temperature in the first hour, followed promptly by a gradual but steady drop.

Thanks are due to my associate, Dr. Nickolas Galdonyi, who directed most of the laboratory experiments, and to Miss Gertrude Beno, my technician, who did much of the detail work in the laboratory.

DISCUSSION.

Dr. Baughman, Richmond, Virginia.—This is certainly a very interesting paper. It takes me back to 1900 when I visited Credé the younger in Dresden. You are no doubt familiar with the colloid Credé ointment. He invited me to see him operate. He took a probe, stuck it into an abscess, put some of his silver solution on it, and offered me to put it in my mouth. I did not care to do so, but he did put it in his own mouth. He told me that this silver solution would cure any sort of septic trouble.

I am very much interested in this matter, I have seen a few cases of sepsis, and I have used this ointment in the treatment of septic cases. Dr. Brown has given us an intelligent and interesting explanation of the faith Credé had in him. I believe that cases of septicemia which are not of streptococcic origin are going to get well. In streptococcus infection I believe in giving them fresh air and as little interference as possible. I am now speaking of puerperal septicemia. I have discarded the Credé ointment method for some time because I have seen no improvement with it. I have not seen any practical effect from the use of that ointment such as we have here with the method of silver injection recommended and advocated by Dr. Brown. His paper is profoundly interesting to me.

Dr. Henry Schwarz, St. Louis, Missouri.—To me Dr. Brown's paper is the most important contribution to this meeting, for the reason that in cases of puerperal septicemia we are up-to-date absolutely helpless, I care not what system or method of treatment is used. In any case where you have a virulent streptococcus in the blood, the woman is going to die. Take a case that is not of the ordinary streptococcic variety, but the streptococcus is brought from a case that has died of erysipelas or something else. We have tried

time and again every new thing that came up; we have tried anti-streptococcic sera, and vaccines, and for the reason stated by the essayist, the sera, while they work well on animals and in animal experiments, do not work so well on human streptococci because in animal passage they change their receptors.

We have used the Credé ointment, but that is altogether different from the silver to which Dr. Brown referred. In Credé's ointment we have not been able in our animal experimentation to show exact results which Dr. Brown seems to have obtained.

I would like Dr. Brown in closing to be a little more explicit. I did not quite understand whether he said it was possible to catch up with the infection or not; whether he could give a loop of this culture to the animal and have death follow at the end of forty-eight hours, whereas the other animal, that receives the electrargol six hours after infection has taken place recovers.

In the paper I read at the Syracuse meeting I said we tried to make a streptococcic vaccine, and in our animal experiments we were never able to catch up with the infection. We could immunize the animal by starting immunization weeks ahead. We could immunize a rabbit against streptococci that would kill the control animal at all times, but we were never able to control the infection after it got a good start, be it ever so short. Of course, in the cases of puerperal sepsis, where the streptococci are found in the blood, there seems to be conclusive evidence that in the electrargol we have such a potent agent that it will be the duty of every man in my position to try it out. It will be one of the next things I will do. It is the first time I have heard of this work, and when I hear of such work I take it up immediately.

Some time ago I read in a journal that some man in New York had used formaldehyd injections and had cured septicemia. I think it was Dr. Elbrecht or my assistant who spoke to me about this. We have been working and experimenting ever since, but we have not so far been able to find anything that will stop a streptococcic infection if it is of the right virulence in a puerperal woman.

Dr. Brown (closing the discussion).—Some one has said that the streptococcic cases rarely get well, while the staphylococcus cases recover if left alone. Of course, there is a vast difference in the way in which the two infections act. A staphylococcic infection usually localizes itself. It does not become general. A streptococcic infection never localized itself. In one of these cases, we had a bacteriemia due to the staphylococcus aureus. In two we had a streptococcus. In one of the others the case was not followed out because my assistants were both out of town at that time. The fifth one was a private case, and we did not have the opportunity of studying it as we wished.

A mistake is frequently made by trying to use too many antiseptics, losing sight of the fact that the ionization of the drug is the factor which brings about the good result.

I do not see any hope for treating streptococcemia in any other way than by getting at it through the blood stream. Take a

rabbit that has recently given birth to its young, and throw into the uterine cavity streptococci, and six minutes later kill the animal, you can demonstrate the streptococcus in the liver. You can see how useless it is to use anything in the way of local means. We must consider the thing systemic and put something that is directly antiseptic in the blood. For this, the electrargol, which is more highly ionized than any other silver salt is probably the one of first choice.

It comes in bulk, also in ampules of 5 and 20 c.c., and with each ampule there is an ampule of normal salt solution which is added to the electrargol, making the electrargol isotonic.

CHRONIC INTESTINAL STASIS:

REPORT OF TWELVE CASES, WITH POINTS OF SPECIAL INTEREST ILLUSTRATED.

BY

WILLIAM SEAMAN BAINBRIDGE, A. M., Sc. D., M. D., C. M.,

New York.

Preamble.—It is now about fifteen years since Sir Arbuthnot Lane first reported the investigations from which have been evolved his now well-known views concerning the existence, nature, causes, results, and treatment of the symptom-complex which he terms *chronic intestinal stasis.* From indifference on the part of the medical profession, some members have passed to attention, then to criticism, some to acceptance and practice, others to condemnation or ridicule. In the meantime Lane himself, and others, ourselves among the number, who have followed him from the first, have gone on studying the subject from various points of view. He has elaborated his original views here, curtailed there, correlated everywhere. As time has passed and his cases have remained longer and longer under his observation, changes in technic have been made as dictated by results.

In his most recent contribution to the subject Lane (1) says, with reference to the skepticism with which his work has been received in some quarters: "Till I saw the marvelous consequences of freeing the ileal effluent, I should have adopted exactly the same skeptical attitude and would have required very definite evidence to convince me.

"That evidence has now been before the world for a long time, and these patients have been carefully observed by the ablest surgeons in the world. They still exist in increasing numbers, and are always at the disposal of any observer who will take the trouble to investigate them.

"It is no longer a question of argument, it is a fact which is absolutely clear and unassailable."

Those who have followed Lane's work, especially those who have merely studied his various writings on the subject, having no personal

knowledge of his cases, are not all in accord with his confidence in the absolute clearness and unassailability of his "evidence." None, however, can deny that he has opened a new field of observation, or that he has approached an old subject from a new and broader point of view. He has caused both internists and surgeons to reconsider, and in large measure to reconstruct, their views concerning the cause and treatment of certain conditions associated with perverted function of the different portions of the alimentary canal. The facts, leaving out of consideration for the moment that which is purely theoretical, which Lane has established concerning the existence of chronic intestinal stasis and the disastrous results thereof when the condition is neglected, are certainly of preeminent importance. Just how far time and further investigation will verify all his contentions regarding the far-reaching effects of stasis, the end results of disease and disaster, cannot be predicted now.

On other occasions I have called attention to various phases of the subject under discussion. To-day, after briefly reviewing certain salient points of theory and fact, I wish to add to the evidence a few cases which seem to indicate the far-reaching importance of chronic intestinal stasis as a factor in the production of pathological conditions hitherto not definitely associated with the drainage scheme of the body.

What is Stasis?—The confusion of ideas concerning the exact meaning of the term chronic intestinal stasis is still apparent in the literature on the subject. Many fail to find in stasis anything different from "old-fashioned constipation," some holding it to be "a descriptive name for the old disease, constipation." Many use the terms indiscriminately, regardless of the portion or portions of the intestine involved, and regardless of the causative factors concerned.

The definitions of constipation which have formerly been accepted as adequate do not describe the condition which we now know as chronic intestinal stasis. Constipation, which is usually considered to involve the large bowel, particularly in its lower portion, results, as a rule, from improper diet, insufficient fluid intake, lack of exercise, a general atonic condition of the body-tissues, or a combination of two or more of these factors. This condition may, and often does, supervene, even in marked degree, when the lumen of the gut is entirely free from angulations, kinks, and other obstructive abnormalities. Furthermore, constipation may exist to a very pronounced degree, even in the intractable form known as obstipation,

and yet the patient may suffer very little from the effects of absorption of the retained effete material and its toxins.

In chronic intestinal stasis, on the other hand, while the factors which produce constipation may be operative, others are involved, and are definitely demonstrable by diagnostic means at our command. In the first place, according to Lane's theory, the evolution of man from the all-four posture of his progenitors of field and forest resulted in a general tendency to visceroptosis. This tendency is often accentuated in the life of the individual by the overloading of the stomach and intestine, especially in early life. The dropping of the abdominal organs gives rise to stress and strain upon the mesentery and its attachments. Nature attempts to offset this strain by the formation of practically bloodless "evolutionary bands," for the purpose of supporting the viscera and preventing the ptosis. Here, as elsewhere, the law of adaptation is not uniformly effectual. These evolutionary bands develop with unequal strength in different parts, and the result is unequal support of the viscera throughout. In consequence of this unequal support, the bowel is held up firmly at some points, while it is allowed to sag at others. Angulation or kinking at the point of support follows. This abnormal fixation at a given point in the length of the intestine, with a dropping of the tube on either side, narrows the lumen of the gut to a greater or less degree according to circumstances, and to that degree interferes with the passage of its contents.

The immediate result of this alteration in the drainage scheme is such a slowing in the passage of the food along the alimentary canal that an excess of toxic matter is formed, especially in the small intestine. In other words, a condition of stasis supervenes. Inasmuch as the factors which lead to this are not transitory, but permanent unless corrected, the condition becomes chronic, and hence we have chronic intestinal stasis. The blood stream, in such cases, surcharged with the toxins taken up from the retained or residual fecal content of the intestine, conveys to the transforming and excretory organs larger quantities of these poisons than they can eliminate. All the tissues of the body then become supplied with blood laden with toxins; they are improperly nourished as a consequence; they deteriorate, and are soon unable to offer the accustomed and proper resistance to infection and disease.

The underlying or primary causes of chronic intestinal stasis are to be found, then, in the developmental history of the human species, as well, presumably, as in the embryological history of the individual. The animal on all-fours may and does have consti-

pation, confined, supposedly, to the rectum and pelvic colon. It is doubtful, however, whether intestinal stasis, as Lane employs the term, exists to any large extent in quadrupeds, though it is quite conceivable that artificial diet and conditions of life may bring about a state of affairs, in some instances, analogous to that found in human beings.

In the all-four state of existence no mechanical factors are operative in the production of stasis, as is the case in the upright posture of man, the abdominal viscera of animals having no cause for the general ptosis found in man.

The association of other diseases, notably tuberculosis, with stasis as remote or end results of this condition, as suggested by Lane, would indicate the very common existence of stasis in bovines and primates. This, however, is a matter yet to be established for man as well as for quadrupeds.

The immediate or secondary causes of chronic intestinal stasis, according to Lane's views, are concerned with nature's efforts to overcome the tendency to visceroptosis by laying down "lines of resistance," which become crystallized into the "evolutionary bands" to which we have alluded. (I have discussed elsewhere(2) the possible inflammatory and congenital origin of some of the adventitious intraabdominal structures which are supposedly concerned in the production of the condition under consideration.) These bands form most frequently at certain points of predilection, though no part of the drainage tube may be considered immune to their development.

The first part of the intestinal tract to be displaced downward in the lifetime of the individual is the large intestine, the "cesspool" of the gastrointestinal canal. It is, therefore, the first to be considered with regard to nature's efforts at support. This part of the gut is favorably situated for downward displacement. Furthermore, it retains its contents for a relatively long time, and largely in a state of solid consistency, the inevitable result in many cases being the dragging down of the containing cesspool. If this is not offset, the results are elongation of the pelvic colon, return of fecal matter into the descending colon, and prolapse of the iliac colon into the true pelvis. Nature, in order to prevent these contingencies, lays down lines of resistance. These appear early in life, according to Lane, "as streaks on the outer surface of the mesentery of the iliac and pelvic colon, and particularly at the junction of the iliac with the pelvic colon." Appearing first about the base of the mesentery, and gradually extending along its surface,

these streaks, in time, become thicker and more distinct, eventually appearing as a definite band, more or less entirely separate from the mesentery except at its limits of attachment. It anchors the gut, forming the "first and last kink" (first to develop, and last in the downward course of the canal). This last kink affects the large bowel where it crosses the brim of the pelvis on the left side, sometimes involving the ovary, as we shall presently see.

The cecum, ascending colon, and the hepatic flexure may become involved in the formation of these evolutionary bands, the cecum and appendix being particularly liable because of their peculiar configuration. One of the first of the structures to be described by Lane was the "apron of peritoneum" (subsequently described by Jackson, and often referred to as "Jackson's membrane"), extending from the cecum and ascending colon to the lateral abdominal wall, sometimes involving in its folds the appendix, particularly when this is unusually long.

Crystallizations of lines of force are likewise formed to give support to the sagging transverse colon, the hepatic and splenic flexures and the greater curvature of the stomach serving as anchorage points in nature's efforts to hold up this part of the gut.

At an early period in the development of the individual opaque streaks form on the undersurface of the mesentery, attaching the last few inches of the ileum, retaining the end of the ileum, and helping to hold up the cecum. The band thus developed, generally known as "Lane's band," or the ileopelvic band, is perhaps more commonly found than any other, the resulting ileal kink giving rise to both immediate and far-reaching harmful results. Ileal stasis has received a great deal of attention from Lane and others latterly. Some investigators have sought a cause for this form of stasis in incompetency of the ileocecal or ileocolic valve(3) and Kellogg, of Battle Creek, Mich., has devised an operation for the correction of this defect.

Case has found the ileocolic valve incompetent in about one-sixth of his bismuth cases. This statement is based on the röntgenoscopic examination of more than 3000 persons, up to June, 1914, most of them constipated, and all suffering from gastrointestinal disturbances. He refers to the finding of incompetency by others as follows: Dietlen, 22 in 100 cases, 1 to 5; Holzknecht and Singer, 3 in 15, 1 in 5. Dielten, however, found insufficiency of the valve in only one of the normal cases examined during a period of several years. This was in keeping with Case's own findings.

Kellogg maintains that radical surgery is, with comparative

rarity, either necessary or profitable in dealing with ileal stasis; and that, granting that this condition is due to bands and kinks, short-circuiting, either with or without colectomy, will not permanently relieve the stagnation in the terminal ileum unless a new ileocolic valve is made. Case, in this connection, says that in every case of stasis in which he has made an *x*-ray examination following the short-circuiting operation he has found retrograde peristalsis in the colon.

In the majority of my cases the ileocecal valve was competent. When patent I have considered this as the effect rather than the cause of the chronic intestinal stasis—a view which is in accord with the opinion of Lane and Jordan. The importance of incompetency of the ileocecal valve, as a causative factor in the production of ileal stasis, must be determined by further study. Its existence in a certain proportion of cases cannot be questioned. Case I, of the series herewith presented, is an illustration of the existence of incompetency of this valve.

Case I.—S., male, aet. thirty-eight. Referred by Dr. Albert W. Ferris, New York City, who previously treated the patient for

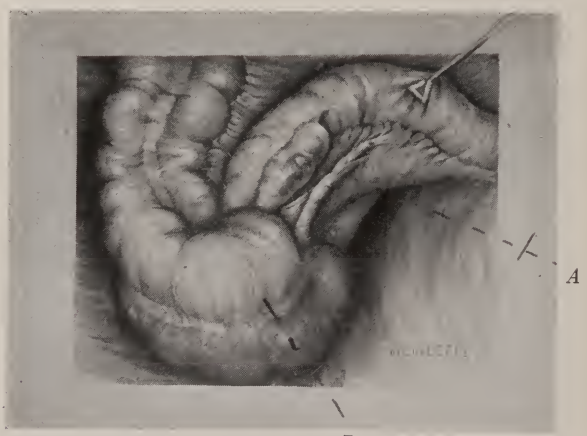


Fig. 1.—*A*, Appendix hung up to undersurface of mesentery of ileum; *B*, mobile cecum, rotated to left.

neurasthenia. First seen by me January 18, 1909. At that time he complained of nervousness, of constipation, of aches and pains in different parts of the body, of cold hands and feet, and of general physical unfitness. He was placed under a régime of rest, diet, and medicinal treatment, under which he got along fairly well, except an occasional acute attack, such as grippe, colds, and sore throat. In January, 1915, he was sent to the Alston Private Hospital,

suffering from acute appendicitis, superimposed upon chronic appendicitis for which he had refused operative treatment. Operation, February 17, 1915. The appendix was found hung up to the undersurface of the mesentery of the terminal ileum, as shown in Fig. 1. The cecum was very mobile, and was rotated from right to left, with the appendix as a fixed point. The ileocecal valve was found to be incompetent. This was corrected by the Kellogg operation, as illustrated in Fig. 1*a*. The appendix was removed in the usual way, and the raw surfaces were carefully sutured over. Uneventful recovery followed, since which time the patient has been perfectly well.

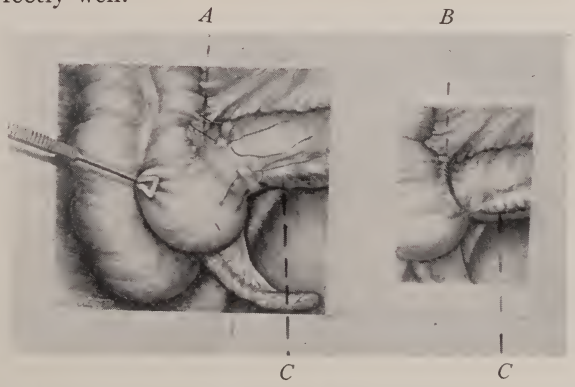


FIG. 1*a*.—*A* and *B*, Successive steps in Kellogg method of correcting incompetency of ileocecal valve; *C*, line of sutures covering raw surface left after removal of "fold of Treves," which was found much enlarged, and the seat of inflammation and broken-down fat.

Duodenojejunal resistances, as peritoneal bands, are formed to oppose the drag upon the jejunum, and the strain which it, in turn, exerts upon the duodenojejunal outlet. Obstruction to the outlet results, the duodenum becomes dilated, drags upon the pyloric outlet, where further resistances are developed, involving, at times, the gall-bladder, the pancreas, and other organs, and giving rise to manifold disturbances, and aggravating others already existing.

Lane has insisted all along upon the study of the digestive tract *as a whole*, and not in its integral parts, in the endeavor to determine the method of development of the various structures which interfere with its drainage and normal function. Considering the question from this point of view, one does not need to describe specifically "the bloodless fold of Treves," "the parietocolic peritoneal fold of Jonnesco and Juvara," "Jackson's membrane," "the genito-mesenteric fold of Douglas Reid," or any other particular structure that may interfere, under certain circumstances, with body drainage through this main channel. Nor is it necessary to determine

whether these structures are congenital, inflammatory, or evolutionary in origin. It is well that secondary matters of this kind be studied, so long as they do not cloud the primary issue—the existence of such adventitious bands and membranes, the interference thereby with body drainage, the resulting stasis in the canal, the absorption by the tissues of poisons from the "unused increment" of fecal content, or the residual feces, the autointoxication, toxemia, or "subinfection" which follows, and the long chain of signs, symptoms, and remote results.

I have repeatedly stated that it seems to me, from years of study of cases before, during, and after operation, that Lane's evolutionary or mechanical theory of the origin of these bands, folds and membranes accounts for a larger number of cases than any of the other theories. All, however, are doubtless correct in certain instances, some being congenital, some inflammatory, and others evolutionary.

The immediate results of the miscarriage of nature's effort to offset the tendency to visceroptosis are more or less serious according to the degree of obstruction to the passage of the contents of the canal, to the degree of "compensatory peristalsis," and to the patient's habits of life and general condition (aside from the stasis).

The kinking or obstruction of the canal, the damming back of the contents, and the general slowing of the action of the drainage system—the stasis, in other words—may be associated with constipation or diarrhea, or both. Sometimes constipation, with perhaps "dyspepsia" or "indigestion" are the symptoms noted by the patient, and the diagnosis is made in accordance with this history. Dyspepsia or indigestion tablets, laxatives, in many instances, constitute the treatment prescribed by the family physician, the one generally consulted by patients thus affected. It is not difficult to imagine that this line of attack brings forth meager results. The chances are that the condition becomes progressively worse. The symptoms first complained of are soon augmented by others more severe in character. Loss of appetite, nausea and vomiting, headache, malaise, backache, pains in different parts of the body, loss of flesh, foul breath, blotched skin, coldness and clamminess of the extremities, are characteristic symptoms which may supervene. To these may be added a lumpy condition of the breast, sometimes mistaken by both patient and physician for cancer; mental lethargy, sometimes pronounced mental depression; loss of interest in the opposite sex, and in life in general.

I have discussed elsewhere[4] the treatment of patients who come

within the category of early stasis, with some or all of the signs and symptoms enumerated, and need not reiterate it here. It is not amiss, however, to emphasize strongly the fact that a large proportion of these patients may be restored to perfect health without any surgical intervention. I wish also to state emphatically that neither Lane nor those of us who have followed him in practice believe that such cases call for operation. Much of the discussion given to the *pros* and *cons* of operating in a radical way for stasis which may be treated by simpler means is entirely unnecessary. It would be fatuous to advocate radical surgery in these milder cases until nonsurgical methods have proved unavailing. It cannot be too strongly emphasized, however, that no patient who presents a symptomatology which suggests chronic intestinal stasis should be waived aside with indifferent consideration. If the "symptomatic treatment" so frequently accorded them is not promptly followed by cessation of the symptoms, more serious study should be accorded the case, first with regard to diagnosis and next with regard to treatment. For it is always to be borne in mind that even stasis is not static; it is not only chronic but progressively so. The neglected or improperly treated victim of a mild degree of stasis to-day may become a member of what I have described as the mid-group tomorrow; and who can say how soon the transfer will be made to the end group?

If the mild case is allowed to progress to the more severe stage, in which the symptoms enumerated above are more pronounced in number and severity, it becomes necessary to reinforce the non-surgical treatment with the simpler surgical procedures, such as cutting bands, straightening angulations and kinks, removing appendices, and correcting other intraabdominal conditions which result from or are aggravated by the condition of stasis.

While, as I have said, it is not contended that the first two groups of cases, the mild and the mid group, are to be ruthlessly subjected to radical surgical procedures, such as ileocolostomy or ileocolostomy with colectomy, the fact remains that many cases reach the advanced degrees of stasis whether or no, and must be treated as such. There is no more reason, from sentimental, physiological, biochemical or surgical points of view, for allowing one of these unfortunate physical derelicts to eke out a miserable, incompetent, *untreated* existence, than there is for allowing a patient with advanced cancer to die under the it-is-too-late-to-do-anything régime! Something should and can be done for them. If they are already physically bankrupt—and they certainly are, in many instances,

before we see them—it is folly to philosophize concerning the advisability of removing a part of the intestine, now entirely unfit, merely because, in the normal state of affairs, it has a function to perform! The skilled plumber, called in to rectify defects in the plumbing of a house, does not dally with parts which are patently worn out and unfit. He promptly removes them and substitutes new ones. In the human house, unfortunately, at this stage of surgical progress, we cannot substitute new parts in the drainage scheme, but we can remove certain obstructive portions, make new connections, render more likely the vicarious assumption of the function of one part by others, and otherwise facilitate drainage and forestall lasting unfitness, absolute invalidism, and perhaps untimely death.

Cases could be multiplied in increasing proportion, as time and experience progress, to illustrate the advanced stages to which chronic intestinal stasis may reach, rendering the patient a pitiful spectacle of general misery and unfitness. The following is one of many, which, it seems to me, proves not only that something should be done, but that the most radical methods would probably have proved more advantageous than the less radical procedure which was employed. It is by such cases that we learn when to resort to ileocolostomy and when to remove the colon.

Case II.—M., female, twenty-six years of age. The patient, when first seen by me, August 14, 1914, gave the following history: She had never been robust, but always slight and nervous. Menstrual history normal until she was twenty, since which time she had suffered a great deal at her periods. Bowels always regular. Six years ago the appendix, with a mass of adhesions, was removed. Previous to this she had had treatment, electrical and otherwise, for "spinal trouble." For two years, 1911–1913, she was confined to bed, during part of which time she received sanitarium care. She complained of constant abdominal pains, sometimes on one side, sometimes on the other, usually worse on the right. When she consulted me she was having fainting spells, nausea and vomiting, marked tenderness of abdomen, cold hands and feet, headache—in short, she was an absolute invalid, able to sit up very little of the time. From the physical examination and the history the diagnosis of chronic intestinal stasis was made. This was subsequently verified by Röntgenoscopic examination.

Operation, Alston's Private Hospital, November 21, 1914. The following conditions were found: Upon opening the abdomen a pyloric spasm was evident, but the finger passed easily through the pyloric orifice. The duodenum was not distended, the gall-bladder was normal, filled with bile. The hepatic flexure of the colon was held as shown in Fig. 2. It was down in the right iliac fossa. The

ascending colon and cecum were kinked from before backward, and somewhat twisted, causing a definite obstruction. At the terminal ileum was a kink from the old appendicular scar (Fig. 2*a*). The

FIG. 2.—*A* and *B*, Bands holding up hepatic flexure and ascending colon; *B* and *C*, ascending colon and cecum kinked from before backward, and somewhat twisted.

FIG. 2*a*.—*A*, Dilated cecum held up, showing, *B*, terminal ileum kinked from old appendiceal scar, with adhesions.

obstructing bands were divided transversely and sutured longitudinally. The ascending colon was straightened, leaving a large amount of raw surface on the right side and on the anterior wall.

With great difficulty the ascending colon was secured in position and the raw surfaces covered. There was no duodenojejunal kink, but the last kink of the sigmoid was accentuated; this was corrected in the usual way (by cutting the angulating bands transversely and suturing longitudinally). The abdominal wall was closed with difficulty because of the friability of the tissues and because of intra-abdominal pressure.

It was a grave question, at the time of the operation, whether it would not have been better to do a short-circuiting operation, with a subsequent colectomy if necessary, but it was decided to give the patient the benefit of the less radical procedure, and await results. She made an uneventful recovery, has steadily improved in general condition, has gained weight, her appetite is good, she is cheerful—in short, she is a changed individual. From chronic invalidism she bids fair to return to good health. It is too early, of course, to make a positive prognosis in this regard, but her deplorable condition certainly warranted what was done for her. Even more radical measures would have been justifiable.

The remote results of chronic intestinal stasis, as suggested by Lane, furnish interesting food for thought. In psychiatry one speaks of border-line cases; in malignant disease we are wont to consider certain conditions precancerous. It is impossible, in either instance, to predict the time and manner of the passing over the line. By means of the sixth sense of diagnosis, that vague something which has been called the *imponderabilia*, we may know that the line has been crossed, but we cannot say when or how.

So, in the condition which we have come to consider under the term chronic intestinal stasis, we cannot say on what border lines of disease the patient may stand; and certainly we cannot say when the line has been passed, beyond which the individual enters another realm of disease and suffering. As we know, Lane contends that chronic intestinal stasis is the groundwork upon which the superstructure of many diseases is placed. "The seventeen symptoms and nine diseases" enumerated by Lane have been pronounced by Adami "to be a horrible jumble." Perhaps so. Yet there is undoubtedly enough in Lane's contentions along this line to warrant serious attention rather than sneering or jocular comment. In the light of latter-day findings with reference to the internal secretions, their relations and correlations, it is unwise to unqualifiedly reject any serious suggestion from a conscientious scientific worker.

Lane has associated chronic intestinal stasis, in a causative relation, with tuberculosis, cancer, rheumatoid arthritis, Raynaud's disease, Still's disease, certain skin and nervous affections, and has reported cases in which these conditions were palliated or cured by

ileocolostomy or colectomy. Chapple has repeatedly called attention to certain pelvic conditions associated with chronic intestinal stasis, and James Mackenzie has received new light upon his "X-Disease" in consequence of Lane's work in connection with chronic intestinal stasis.

In my work as visiting surgeon to the New York City Children's Hospital and Schools, Randall's Island, as well as in private practice, I have long noted the connection between what I formerly considered as constipation, and certain forms of mental and nervous affections, particularly epilepsy. I have repeatedly observed marked improvement of symptoms, and in mild epilepsy, a lessening in frequency and severity of the attacks, following a thorough clearing out of the alimentary canal. Ten years ago, when I became interested in the study of chronic intestinal stasis, and began to apply my findings to the patients on Randall's Island, I became more strongly convinced than ever that much could be done for these patients through the correction of defects in the drainage scheme of their bodies. I have therefore, for a number of years, been making observations along this line, full report of which will be published later. I have already reported one case* in which epileptic seizures decreased in frequency and severity following the operative treatment of chronic intestinal stasis. The following case is interesting in this connection:

Case III.—K., male, aged eleven years. Referred by Dr. Eliza M. Mosher, of Brooklyn, N. Y., December 3, 1914. With the exception of hydrocele, when one year of age, for which two operations were performed, the last one followed by no return of the trouble, the previous history presented no points of interest other than that which applies to epilepsy. Since the third year of life the child has had epileptic seizures (probably *petit mal*), which the physicians consulted pronounced due to indigestion. No early history of constipation. The epileptic attacks occurred at intervals of from one to three weeks, when he would have from four to five a day. The usual treatment for this condition, according to the history, gave no relief. When he consulted me physical examination showed abdominal distention; moderate distention of stomach; prolapse of transverse colon to below umbilicus; wide dilatation of ileum on line with umbilicus; mobility of cecum.

Operation, December 17, 1914, at the New York Skin and Cancer Hospital. The following were the findings: Dilated stomach, reaching below umbilicus; ptosis of transverse colon; rather sharp

* Case II, presented before the American Association of Obstetricians and Gynecologists, at Buffalo, N. Y., September 15, 1914. See "Operative Findings in Twelve Cases of Chronic Intestinal Stasis," Am. Jour. of Obst. and Diseases of Women and Children, vol. lxxi, No. 1, 1915.

duodenojejunal angle; ileopelvic band and ileal kink. At the end of the mesentery of the small intestine, about 2 inches from the cecum, was a large mass of calcified lymph glands, the calcareous

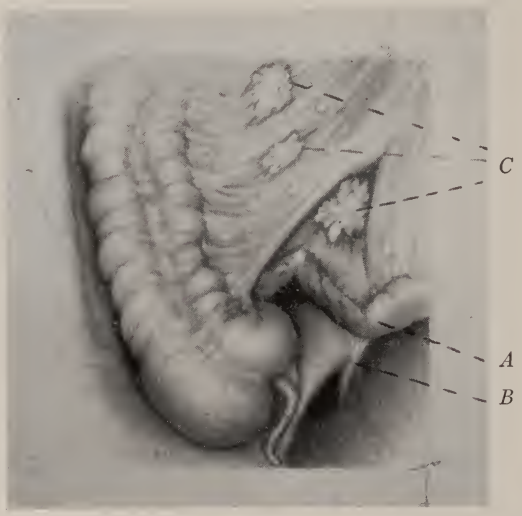


FIG. 3.—*A*, Ileal kink, resulting from, *B*, ileopelvic band; *C*, calcareous deposits in mesentery.

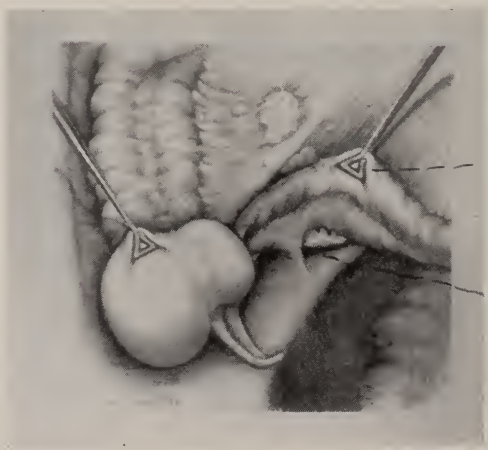


FIG. 3*a*.—*A*, Ileum held up, showing, *B*, attachment of ileopelvic band to brim of pelvis.

portion about an inch in diameter, showing plainly on the upper surface of the mesentery, and also, though in smaller area, on the undersurface when the gut was lifted up. From this mass of glands

upward and to the left was a chain of enlarged lymph glands on the mesocolon, some of them calcified. There was also a second mass of calcified glands about 3 inches from the first. Enlarged, but not calcified, glands were found beneath the mesentery of the small intestine. Cecum and ascending colon moderately dilated, but showed no adhesions. Appendix not involved. The conditions found around the cecum and terminal ileum are shown in Figs. 3 and 3*a*. Ileocolostomy performed. Removal of the calcareous deposits deferred, to be taken care of in the event that colectomy proved to be necessary later. Especial care was taken in closing the wound in order to guard against the sutures giving way in case of an epileptic seizure.

The patient had two slight convulsive attacks in February, but no real epilepsy since that time. He has gained in weight, and is seemingly perfectly well.

Lane has recently made the statement that "if women were not imperfectly drained the gynecologist would not have evolved." Whether we do or do not agree with him in this regard, there is unquestionably in many cases a causative connection between chronic intestinal stasis and many pelvic disorders. The following cases illustrate this.

Case IV.—Mrs. S., twenty-four years of age, consulted me January 29, 1915, giving a history of pain in back, in hypogastric

Fig. 4.—*A*, Broad V-shaped ileopelvic band; *B*, bands attaching terminal ileum to cecum; *C*, lower portion of parietocolic bands.

and right iliac region. This varied from mere soreness to a severe, sharp pain. The appendix had been removed seven years before. Since that time she has had progressive constipation, headache, loss of appetite, and some loss of weight.

Operation, January 29, 1915, at the New York Polyclinic Hos-

pital. Upon exploration of the abdomen a definite ileopelvic band was found, as shown in Fig. 4, extending along the ileum for a distance of about 2 inches when extended, and forming a V, the lower end of which went into the true pelvis. This was freed and the raw surfaces carefully sutured. The large, redundant and dilated cecum was plicated by the method of bringing the posterior and anterior muscle bands together, holding the cecum and ascending colon into normal position. The right ovary and tube were negative. The left ovary was cystic and enlarged. A strong band of adhesions ran from the pelvic colon to the left ovary (Fig. 4*a*), rotating the

FIG. 4*a*.—*A*, Band from colon to left ovary.

colon downward. This band was cut transversely and the peritoneum sutured longitudinally. The ovary was removed. The patient made an uneventful recovery, and has steadily improved in health since the operation.

CASE V.—Mrs. P., forty-six years of age; two children. Referred by Dr. Charles R. Walker, of Concord, N. H., February 23, 1915. According to the history the patient had had intestinal trouble for twenty years. At first, it was supposed to be uterine disease following the birth of her second child, and she was treated for years with tampons and pessaries. For a number of years she was a nervous and physical wreck. In 1909 she underwent operation for perineal laceration, and in the same year laparotomy was performed for uterine suspension by shortening ligaments. Following this she was a complete invalid for months, and underwent all manner of treatment for all kinds of ailments, up to May, 1911. She then went to Boston, where *x*-ray examinations were made, showing prolapse of the colon. The surgeon then consulted lifted up the colon and "stitched it to the stomach," removing the appendix. No

improvement followed this operation, and a year later the same surgeon, on *x*-ray examination, found the colon was not held in place. The patient underwent a further operation, and continued to suffer intense pain, at times, in both sides. Movements from the bowels were attended with extreme difficulty and intense pain.

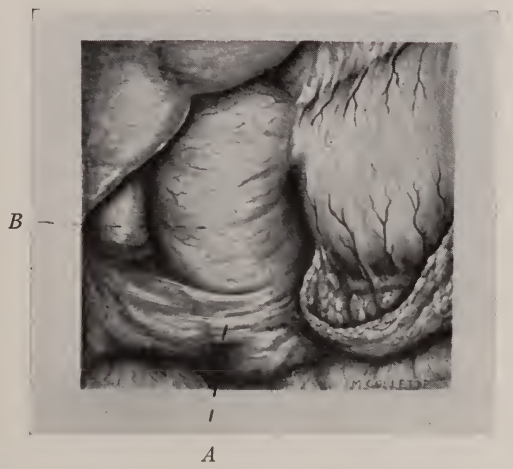


FIG. 5.—*A*, Bands across duodenum; *B*, dilated duodenum.

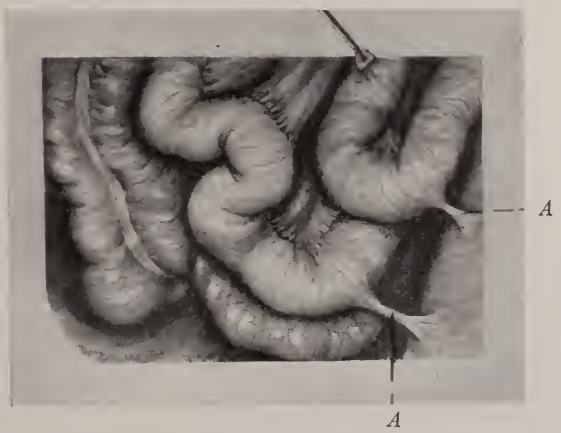


FIG. 5*a*.—*A*, Bands causing diverticula of small intestine.

When I examined her she presented marked symptoms of chronic intestinal stasis. Operation, March 6, 1915, at the New York Polyclinic Hospital, with the following findings: Upon opening the abdomen the great omentum was found turned up and fastened to the anterior abdominal wall at its upper portion, the stomach being thus slung upward. On separating a little of the right

extremity of the great omentum when traction was made on the transverse colon, as when in erect position, a number of bands were seen across the second portion of the duodenum (Fig. 5), causing distinct obstruction, evident even on the operating-table, the duodenum at its upper portion being greatly dilated. The pylorus was normal. The duodenal band was cut transversely, the angulation of the duodenum freed, and a flap of peritoneum (which was in such position as to give good support to the hepatic flexure) was placed over the raw surface. The ascending colon was fairly normal, excepting that the hepatic flexure was low. About 3 and 5 feet distant from the ileocecal valve on the small intestine were distinct bands (Fig. 5*a*), forming diverticula on the convexity of the

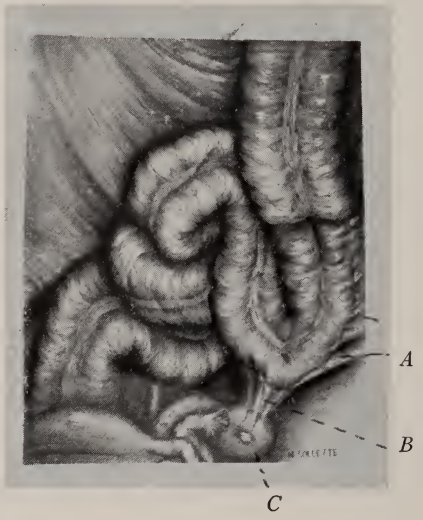


FIG. 5*b*.—*A*, Bands attaching pelvic colon to flank; *B*, band attaching pelvic colon to left ovary; *C*, left ovary.

gut, and adherent to the old abdominal scar. These bands of adhesion, the size of a lead pencil, were cut and the raw surfaces on the abdominal wall and on the gut were sutured in the usual way, with interrupted linen stitches, paraffin dipped, longitudinally to the long axis of the gut. The descending colon was tightly adherent in the left flank, the pelvic colon showing three bands (Fig. 5*b*), the upper two connected together. These were cut transversely and sutured longitudinally. The lower band was adherent to the broad ligament and to a cystic and degenerated ovary. The ovarian vein was varicose, being as large as the index-finger. This was cut high up and the ovary, with the cyst the size of a robin's egg, removed from the end of the tube, and the tube exsected. A flap of peritoneum from the abdominal wall was sutured in position, the raw surface turned toward the gut so as not to leave any raw surfaces, and paraffin then applied. The ileocecal valve was tested

for its competency, and while it was possible to get a little air past, it was practically normal. The slight lack of tone in the valve was probably accounted for by the anesthetic. (May this not be true of many cases reported and operated upon for incompetency of the ileocecal valve?) The great omentum was left adherent in the upper part of the old scar, as it seemed to be securely anchored, and appeared not to obstruct the onflow of the intestinal contents. The great obstruction was in the duodenum and the small intestine at the site of the bands, and in the pelvic colon. Around the bands in the pelvis was a great deal of evolutionary tissue, also some inflammatory scar tissue—a combination of the two kinds of stasis "inflammatory" and "evolutionary."

The operation performed gives the patient a reasonable chance of being greatly benefited and perhaps entirely cured. If this palliative operative treatment does not effect a cure, ileocolostomy or colectomy may be resorted to later. The trouble caused by the involvement in the bands of the ovary and tube will certainly be entirely relieved. The patient, apparently much improved, was presented before the New Hampshire Medical Society, May 19, 1915.

Case VI.—Mrs. C., thirty-six years of age, one child. Referred by Dr. Woods Hutchinson and Dr. William Van Valzah Hayes, of New York City, October 17, 1914. She had been progressively losing flesh and strength, falling from 125 to 87 pounds. She gradually grew worse, until she became practically an invalid, with severe headaches, general abdominal discomfort, marked constipation, a great deal of nervous depression—so great at times that she wished to die—and periodic attacks of pain in the right side, simulating appendicitis, but coming on more frequently at the menstrual period. Diet and medical treatment was of little avail. From the history and physical examination the diagnosis of chronic intestinal stasis was made. Operation, New York Polyclinic Hospital, October 21, 1914, with the following findings: Cecum dilated and very mobile, falling into pelvis. Inferior and outer caccules much dilated, forming a large cavity for gas and feces to collect. Thinned-out parietocolic bands about ascending colon (Fig. 6), holding it up in the false pelvis. The posterior muscle band was anterior with the descent of the gut and its rotation from without inward. The appendix was inflamed, and presented a number of adhesions. It was removed in the usual way. There was angulation at the duodenojejunal junction, which was corrected (Fig. 6a). From the mesoappendix there was a band running down into the pelvis, involving the right ovary, which was somewhat fibroid (Fig. 6). These bands were detached and liquid paraffin freely applied. The cecum and ascending colon were anchored in position to the lateral wall. The pelvic colon was somewhat redundant, but the last kink was fairly normal. The splenic flexure was below the umbilicus, but its outlet was not obstructed.

The patient made an uneventful recovery from this conservative operation, and has steadily improved since. All symptoms have

disappeared, she now weighs 118 pounds, has good appetite, is cheerful, has no more of the attacks of pain in the right side at the menstrual period—in short, she is perfectly well.

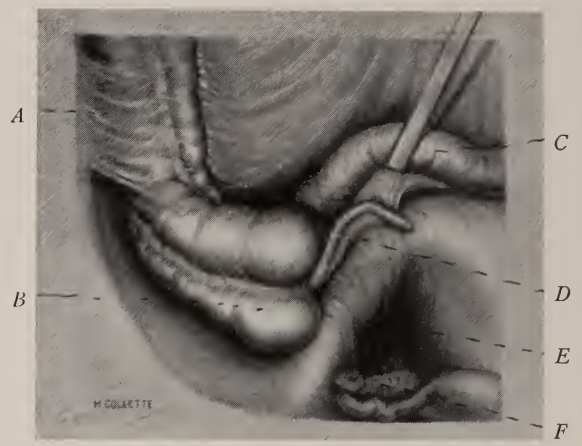


FIG. 6.—*A*, Parietocolic bands, attaching ascending colon to right abdominal wall; *B*, cecum, dilated and mobile; *C*, ileum held up, showing band of attachment to inflamed appendix; *D*, appendix; *E*, band from mesoappendix to right ovary; *F*, right ovary.

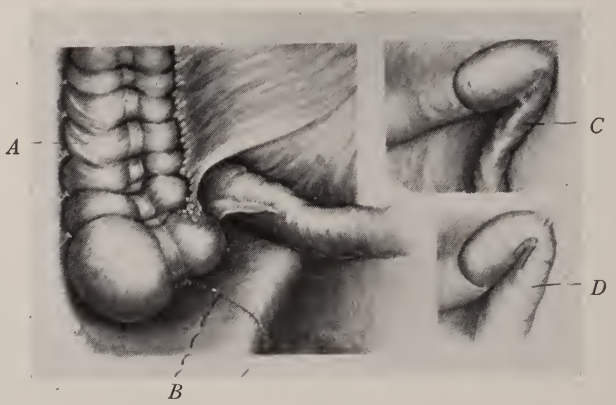


FIG. 6*a*.—*A*, Parietocolic bands severed, raw surfaces covered, cecum and ascending colon sutured in place; *B*, band from mesoappendix to ovary severed and raw surface covered by interrupted sutures; *C*, accentuated duodenojejunal angle; *D*, *C* corrected.

CASE VII.—Mrs. C., forty years of age, one child, several miscarriages. Operation, January 30, 1912, for appendicitis. Curetted on the same occasion. Fairly well, except for digestive disturbances and profuse menstrual flow, until the latter part of 1914. She then

consulted me again, complaining of pain in the lower abdomen toward the left side, pain in the back, extending down to the knees, digestive disturbances, and excessive menstrual flow, lasting sometimes for about twenty days. For about a year she had been under treatment for what her physician pronounced mucous colitis. Frequent vomiting attacks with nausea increasing in number and severity until ten days before operation when nothing could be retained. Operation, January 13, 1915, at Alston's Private Hospital, revealed the following conditions: Extensive adhesions between the coils of the small intestine and omentum and the anterior abdominal wall (Fig. 7), necessitating very careful opening of the

FIG. 7.—*A*, Extensive adhesions between coils of small intestine and omentum, which were also adherent to anterior abdominal wall; *B*, omentum attached to ascending colon.

peritoneum. The omentum was attached to the abdominal wall in the vicinity of the median line below the umbilicus, and also to the ascending colon, from cecum to hepatic flexure. In the interval between these two lines of adhesions the omentum was attached to the coils of small intestines, which were, in turn, attached to each other. There were extensive adhesions between the last 3 inches of the ileum and the cecum, and between the ileum and a cyst of the right ovary, the Fallopian tube, and the wall of the pelvis (Fig. 7*a*). The uterus was much enlarged, and contained a number of small subperitoneal fibroids. The right ovary was cystic, measuring about an inch and a half in diameter. The left ovary and tube had been removed at a previous operation (1912), and in their situation was a serous cyst, measuring 3 inches in diameter, probably parovarian. This was adherent to the posterior abdominal wall and to the intestinal coils in such a way as to shut off the true

pelvis. There were no adhesions in the region of the gall-bladder, but this organ contained three stones about as large as the tip of a finger. These were not interfered with because of the extent of the operation in the abdomen. All of the adhesions were severed. About 2 inches of the omentum, which was greatly thickened, presented so much raw surface that it was amputated, the line of division being separately ligated with catgut and then rolled over

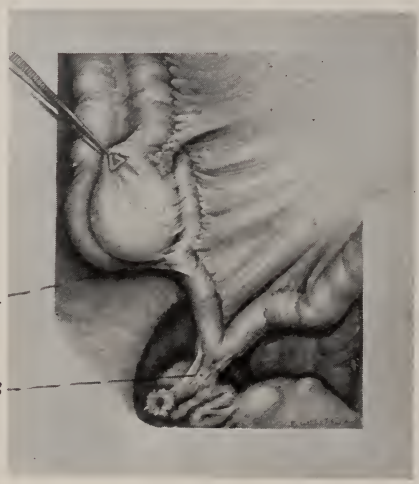


FIG. 7a.—*A*, Terminal ileum adherent to cecum; *B*, bnnd attaching ileum to right ovary.

and covered in with a continuous silk suture. The right ovary and tube, the body of the uterus, and the parovarian cyst were removed *en masse*. Before closing the abdomen a considerable quantity of sterilized liquid paraffin was distributed over the raw surfaces left by breaking up adhesions which were too extensive to be covered by suturing.

The patient made an uneventful recovery, and has continued to improve, until she has been practically restored to health.

Lane has reported cases which, in his opinion, establish the existence of a causal relationship between chronic intestinal stasis and diseases of the liver, gall-bladder, and pancreas. Many diseases of the liver, he holds, may result from infections of the ducts, its tissues being devitalized by the large amount of toxins in the blood which nourishes them. This appears to be a reasonable hypothesis, and if it be true, the prevention and cure of chronic intestinal stasis forms an important part of the prevention and cure of diseases of these organs, including, in Lane's opinion, visceral cancer. The following cases are suggestive in this connection.

Case VIII.—C., male, aged nine. Referred by Dr. S. S. Bedient, Little Valley, N. Y., August 6, 1912. Two years before the patient had begun to have periodic attacks of severe pain in the left side, high up under the ribs, with prolonged vomiting, sometimes lasting for hours, after a full movement of the bowels. Several physicians and surgeons were consulted, and various diagnoses were made—Addison's disease, toxemia, Bright's disease, uremic poisoning, stoppage of gall-duct. Careful dietary and hygienic régime, recommended by one of the physicians consulted, was rigidly carried out for two years, with no results. Physical examination revealed distinct tenderness at the left hypochondrium; slight enlargement of the left kidney; some dilatation of the stomach; distention of colon

Fig. 8.—*A*, Long appendix, attached to left; *B*, enlarged glands in mesoappendix; *C*, ileum help up. If allowed to fall, as when the individual is in the upright position, it would form an "appendiceal tie"—the appendix would form the fixed point causing an ileal kink, with resulting ileal stasis.

at splenic flexure. Urine contained albumin and few casts. Exploratory laparotomy, at Chautauqua Lodge, August 17, 1912, with the following findings: Stomach dilated; a few short adhesions about pylorus. Appendix the seat of chronic inflammation; enlargement of a chain of small glands from appendix down to mesoappendix and up under mesentery (Fig. 8). Appendix attached over to left side, almost to splenic flexure of colon. Ileum and duodenum dilated. Ileal kink, with backward pressure on gall-duct, and pancreas, as evidenced by congestion. Appendix removed, adhesions severed, peritoneum sutured and cut surfaces covered with liquid paraffin. Recovery uneventful, discharged in two weeks with urine normal. March, 1915, doctor reports patient as well since discharge and urine normal.

Case IX.—R., female, fifty-nine years of age, unmarried. Referred by Dr. A. P. Lensmann, Seattle, Wash., November 6, 1914. A long history of chronic constipation, abdominal pains, sometimes

acute and severe, backache, cold hands and feet, loss of weight and strength; practically a chronic invalid. Consulted several physicians, and was given nonsurgical treatment for duodenal ulcer.

FIG. 9.—*A*, Hepatic flexure, accentuated by bands; *B*, parietocolic band; *C*, prolapsed transverse colon; *D*, cecum, elongated and pouch-like; *E*, appendix adherent to cecum and fixed loop of ileum.

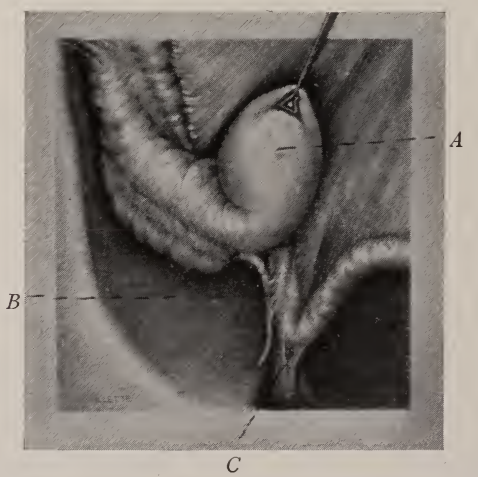


FIG. 9*a*.—*A*, Cecum; *B*, ileum and attached appendix; *C*, ileopelvic band and ileal kink.

From the history and physical examination, reinforced by Röntgenoscopic examination, the diagnosis of chronic intestinal stasis was made. Operation, December 8, 1914, at the New York Poly-

clinic Hospital. The following conditions were found: On exploration, before disturbing the viscera, the greater curvature of the stomach was found to be at the level of the pelvic brim and the pylorus at the level of the umbilicus. The scar of an old ulcer was plainly felt on the posterior wall of the first portion of the duodenum, resting on the head of the pancreas. The duodenum was dilated and sacculated slightly. The duodenojejunal angle was accentuated by an adventitious band of adhesions 1 inch wide, fibrous, and thickened at the inferior margin. A loop of terminal ileum was firmly anchored over the brim of the true pelvis by three connected bands converging toward the infundibulopelvic ligament. The cecum presented itself as a 4-inch, elongated pouch, rotated in

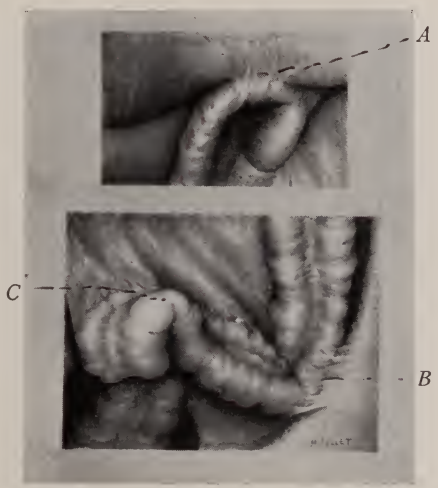


FIG. 9*b*.—*A*, Adhesions of small bowel to undersurface of transverse mesocolon at site of inflammatory mass, evidently result of ulceration; *B*, band attaching last kink of pelvic colon to flank, causing accentuation of kink; *C*, redundant pelvic colon.

three-quarters of a circle on its long axis (Fig. 9). The appendix was atrophic and adherent to a cecal pouch and to the fixed loop of the ileum (Figs. 9 and 9*a*). The ascending colon was angulated by a band of adhesions attached to the right lateral wall of the abdomen midway between the ileocecal valve and the hepatic flexure (Fig. 9). The transverse colon was flabby, pale in color, and prolapsed into the pelvis (Fig. 9). The splenic flexure of the colon was suspended about 3 inches below the average point of fixation. The last kink of the pelvic colon was markedly accentuated by strong fibrous bands (Fig. 9*b*), and was redundant. Ileocolostomy with colectomy was performed.

Twelve days after operation the patient developed typhoid fever, which lasted about three weeks. Small abscess formed in the upper

part of the wound weakening the wall, otherwise convalescence uneventful. Condition August 31, 1915, greatly improved, and steadily gaining. Small abdominal hernia to be attended to later.

Case X.—Mrs. I., forty-three years of age. Referred by Dr. William Van Valzah Hayes, New York City. Admitted to the New York Polyclinic Hospital, February, 1915. According to the history, eight years before she had had abdominal pain, nausea, and vomiting, coming on after eating; no jaundice. Was operated on for gall-stones, several stones being removed. She recovered from this operation, but three weeks later had a return of pain and was again operated upon, this time for renal stones. None were found, but a floating kidney, right side, was discovered. She still complained of nausea and vomiting, with large quantities of

Fig. 10.—*A* and *B*, Adhesion of gall-bladder (*A*) and duodenum (*B*) to abdominal wall at site of old scar.

mucus. Two months before admission to the hospital the symptoms became so severe that she again sought relief. Jaundice of marked degree had developed. The diagnosis of chronic pancreatitis, obstructive jaundice, gall-stones, and chronic intestinal stasis made from the history and physical signs. Operation, February 23, 1915. The following conditions were found: The liver was adherent to the costal cartilage of the ninth rib and to the scar of a former operation (extrarectal incision) (Fig. 10). The gall-bladder was adherent to the liver, duodenum, great omentum, and the old scar. It had evidently been drained at the former operation. With great difficulty it was separated from the wound and from the liver, and the liver from the scar. The gall-bladder was not opened, but the omentum was separated and pushed downward, and the gall-bladder dissected free down to its duct. A mass was felt at the head of the pancreas, nodular in character, extending through the entire pancreas, but more marked at the head. The spleen was somewhat

enlarged, and there were adhesions of the great omentum to the left side, in the neighborhood of the costocolic ligament. About an inch beyond the pylorus was an acute angulation backward of the duodenum (Fig. 10*a*), which was tightly adherent to the great omentum in the neighborhood of the foramen of Winslow. These adhesions were separated and an extensive raw surface left on the first portion of the duodenum, which was covered in part by the gall-bladder. The gall-bladder was then opened and seventeen stones, the size of peas, removed. Anastomosis was made between the gall-bladder and the first portion of the duodenum (Fig. 10*a*). The entire pancreas was enlarged, the absence of metastasis suggesting inflammation rather than malignancy. The angulation of the

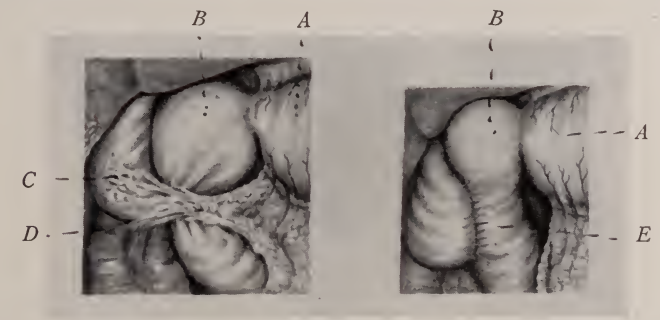


FIG. 10*a*.—*A*, Stomach; *B*, dilated duodenum before and after operation; *C*, gall-bladder; *D*, band of adhesion between edge of great omentum, gall-bladder, and head of pancreas; *E*, cholecystduodenostomy performed.

duodenum was corrected as far as possible and the raw surfaces covered, paraffin being then introduced. The pyloric orifice barely admitted the tip of the index-finger, the walls being thickened. A piece of great omentum was sutured into position between the gall-bladder and the liver and over the duodenum. Convalescence was uneventful; patient much improved and steadily gaining when last seen, April 29, 1915,

A very frequent concomitant of chronic intestinal stasis is dilatation of the stomach, with ulceration about the pylorus. The following are illustrative cases:

CASE XI.—Mrs. S., twenty-two years of age. Referred by Dr. I. Arthur Stoloff, New York City, December 16, 1913. After the birth of her first child, now three years old, the patient began to have severe pains in the right side. She consulted a surgeon who operated upon her for gall-stones, removing a hundred stones. She continued to have pain in the side, but not so severe as before the operation. Another surgeon advised operation for floating kidney, but this was not accepted. When first seen by me she complained of constant pains in the abdomen, of nausea and of

heartburn. On physical examination it was found that the scar over the gall-bladder was adherent to the liver, and there were undoubtedly adhesions surrounding the pylorus, extending down

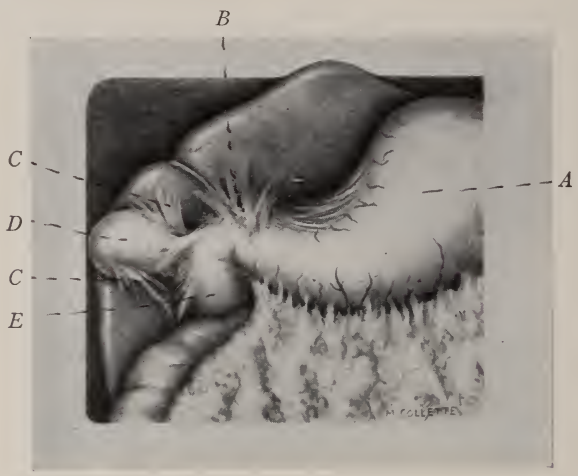


FIG. 11.—*A*, Stomach; *B*, adhesions between liver and stomach; *C*, adhesions between liver and gall-bladder; *D*, Gall-bladder adherent to duodenum; *E*, liver adherent to duodenum.

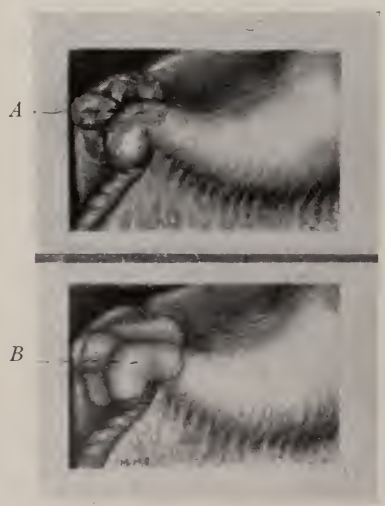


FIG. 11*a*.—*A*, Adhesions separated, leaving raw surfaces; *B*, raw surfaces covered with pad of fat from thigh.

toward the duodenum. There was distinct tenderness along the ascending colon. The right kidney was slightly movable. Opera-

tion, January 30, 1914, at the New York Polyclinic Hospital, with the following findings: The stomach and gall-bladder were adherent to the anterior abdominal wall; there were also lines of adhesion extending from the stomach to the duodenum, gall-bladder and falciform ligament (Fig. 11). These adhesions were separated (Fig. 11*a*), and a pad of fat, removed from the left thigh, was placed between the raw surfaces of the gall-bladder, stomach and duodenum and sutured. Adhesions about the mobile cecum were severed, and the appendix was removed. Recovery uneventful. Since the operation the patient has steadily improved, and is now well.

Case XII.—Mrs. P., forty-five years of age. Referred by Dr. William Van Valzah Hayes, New York City, March 1, 1915, with a history of ulcer and pyloric stenosis, and with the recommendation for operation. Upon this history, the physical examination, and

Fig. 12.—*A*, Markedly dilated stomach; *B*, dilated duodenum; *C*, obstructed pylorus at site of old ulcer.

the fluorscopic diagnosis, operation was advised, and performed, March 8, 1915, at the New York Skin and Cancer Hospital. The following conditions were found: The great omentum was adherent to an old appendicular scar on the abdominal wall. A band from the center of the ascending colon, very broad and vascular, extending from the lateral wall opposite the crest of the ileum, leaving the lower part of the ascending colon and cecum very mobile and dilated. The appendix was absent. The cecum and ascending colon could be drawn up out of the abdominal cavity and carried over to the left nipple. The cecum was very much enlarged, with thickened walls. Running under the mesentery of the terminal ileum were plainly visible crystallizations of lines of stress. The pelvic colon was very redundant, and the last kink was accentuated. This was corrected. The stomach was markedly dilated, extending to the

symphysis pubis. The duodenum was dilated to the size of the large intestine (Fig. 12). Slight kinking at the duodenojejunal junction. Nonmalignant ulcer, the size of a silver dollar, on pylorus. Gastroenterostomy was performed, a very large opening being made.

The transverse colon being very mobile, the hepatic flexure being well down in the flank, the cecum being a great cesspool three times

FIG. 12*a*.—*A*, First step of cecosigmoidostomy. Pictures shows opening from cecal side.

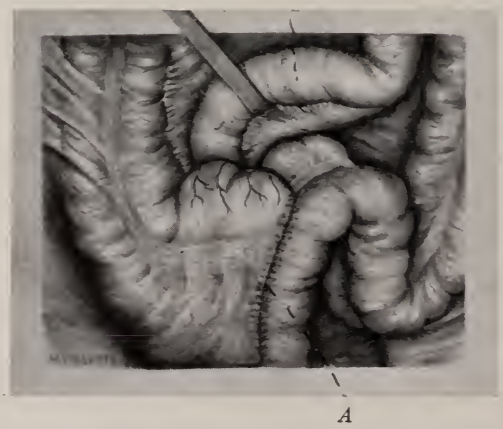


FIG. 12*b*.—*A*, Cecosigmoidostomy completed. Dilated cecum united to pelvic colon below last kink.

normal size and occupying the culdesac of Douglas, the sigmoid being redundant, and the patient being in very poor condition, it was determined to test the efficacy of the following method (Figs. 12*a* and 12*b*); the butt end of the cecum was united to the pelvic colon low down in the pelvis, below the last kink, the opening being

made large enough to admit four fingers. The cecum was opened, and when opened showed a normal ileocecal valve. This valve had been tested carefully and found to be competent.

Before complete closure of the abdomen the cavity was filled with warm normal saline solution. As soon as this was introduced the pulse showed immediate improvement. Uneventful recovery. Steady gain in strength and health, patient feeling better than for years.

The method of introducing the saline solution is that which I have employed for the introduction of oxygen,(5) and is shown in Figs. 13, 14, 15 and 16. By this method exact quantities of solution can be employed, which is preferable to the method of pouring it into the abdominal cavity.

Conclusion.—The condition and the resulting symptom-complex now described under the designation, chronic intestinal stasis, has been established through the lapse of time and the accumulation of experience. It is, primarily, a condition which is amenable to dietetic, hygienic and medicinal treatment, and should not, therefore, be so generally considered as coming entirely within the category of a surgical affection. If, however, through neglect or improper treatment the individual case is no longer amenable [to preventive measures and those which come within the province of the internist or gastroenterologist, conservative surgical procedures may be employed, especially in milder cases. Unfortunately, many cases progress to a more advanced stage before relief is definitely sought, and in such cases it may be necessary to resort to the more radical surgical procedures, such as ileocolostomy or colectomy. The sequence of therapeutic intervention always to be kept in mind is: (1) Prevention; (2) Conservative Surgery; (3) Radical Surgery In all cases in which surgical treatment is employed, the after-care of the patient is of the utmost importance. Nature, so long outraged, cannot justly be expected to resume normal function at once and without the aid furnished by regulated diet and habits of life, artificial support to the weakened abdominal muscles and viscera, and other measures suited to the needs of the individual.

From the cases cited, and many others in my own experience and that of some of my confrères, there is reason to believe that chronic intestinal stasis plays an important part, either in initiating or in augmenting, many conditions which were formerly not associated, from the etiologic point of view, with perverted function of the gastrointestinal tract. These far-reaching possibilities should be borne in mind by practitioners in every field of medicine and surgery.

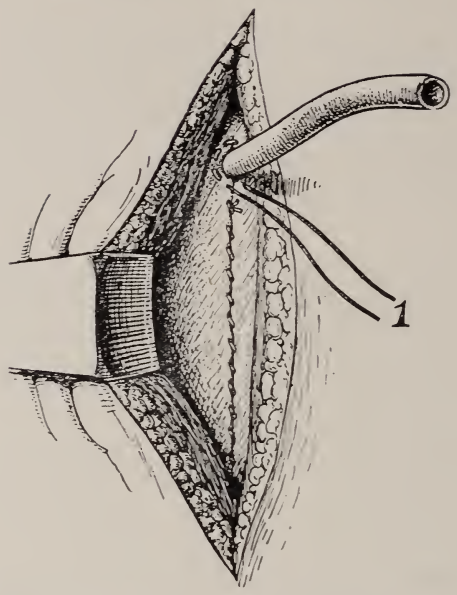


FIG. 13.—The abdominal wound is closed except at the lower or upper end as the case may be, where the free end of the tube is placed within the abdominal cavity. One stitch is introduced above and one below the tube and these are tied. An interrupted stitch is placed in the peritoneum at this point, ready to be tied, and a purse-string suture is introduced around the tube in the peritoneum left long but not tied (1).

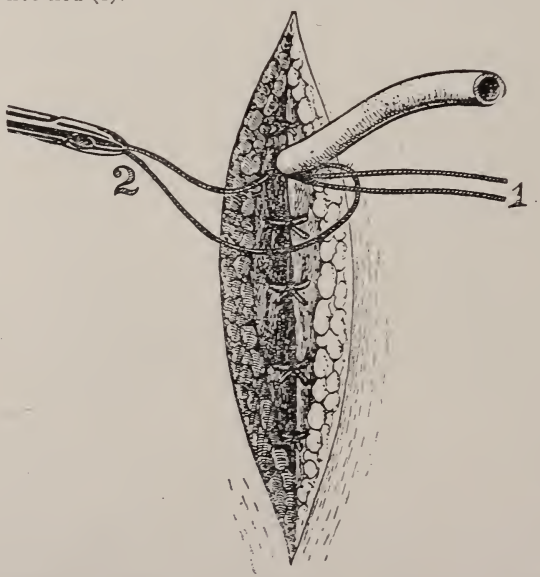


FIG. 14.—All layers of the abdominal wall are closed up to the skin and the stitches tied, with the exception of those in juxta-position to the tube. 1, Untied ends of peritoneal purse-string; 2, untied suture through aponeurosis passing half way around the tube. Aponeurosis closed with interrupted sutures.

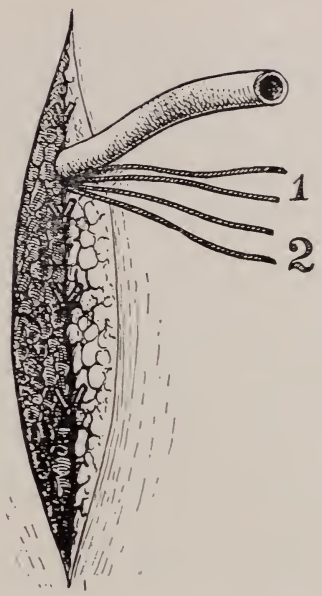


FIG. 15.—Superficial fascia united. 1, Untied peritoneal purse-string; 2, untied aponeurosis suture.

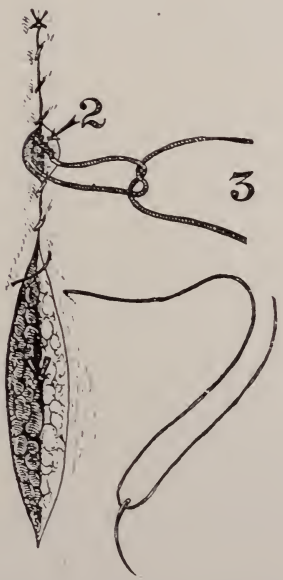


FIG. 16.—Tube withdrawn; 2, peritoneal purse-string tied, knot beneath aponeurosis; 3, aponeurosis suture. Figure illustrates practicability of placing skin stitches while tube remains in the abdomen.

REFERENCES.

1. Lane, Sir Arbuthnot. The Operative Treatment of Chronic Intestinal Stasis, Third Edition, London, 1915, p. 84.

2. Bainbridge, Wm. Seaman. The Significance of Intraabdominal "Bands," "Folds," and "Veils." *Boston Med. and Surg. Jour.*, vol. clxx, No. 8, pp. 261–267, February 19, 1914.

3. Case, James T. Röntgenologic Observations on the Function of the Ileocolic Valve. *Jour. Am. Med. Assn.*, Oct. 3, 1914, vol. lxiii, 1194.

Ibid. Further *X*-ray Studies on the Ileocecal Valve and the Appendix. *Am. Jour. of Röntgenology*, August, 1914.

Ibid. A Critical Study of Intestinal Stasis, Including New Observations and Conclusions Respecting the Causes of Ileal Stasis. *Surg., Gyn., and Obst.*, November, 1914, 592.

Rutherford, A. H. The Ileocecal Valve, 1914.

Case, James T. *X*-ray Observations on Colonic Peristalsis and Antiperistalsis with Special Reference to the Function of the Ileocolic Valve. Trans. XVIIth International Congress of Medicine, Section XXII, Radiology, August 6, 1913.

Kellogg, J. H. Surgery of the Ileocolic Valve. *Surg., Obst., and Gyn.*, 1913.

4. Bainbridge, Wm. Seaman. The Cancer Problem, 1914, pp. 202 and 444.

Ibid. A Contribution to the Study of Chronic Intestinal Stasis. *Medical Record*, September 27, 1913.

Ibid. Chronic Intestinal Stasis. Types of Cases. Preventive and Medical Treatment Outlined. *Woman's Med. Jour.*, January, 1914.

Ibid. Oxygen in Medicine and Surgery—A Contribution, with Report of Cases. *New York State Jour. of Med.*, June, 1908.

Ibid. The Intraabdominal Administration of Oxygen—A Further Contribution, with Reports of Additional Cases. *Annals of Surgery*, March, 1909.

Ibid. Technic of the Intraabdominal Administration of Oxygen. *American Jour. of Surg.*, October, 1913.

Ibid. Intestinal Stasis in Relation to Cancer Etiology and Prophylaxis. *Jour. of Med. Soc. of New Jersey*, 1912.

Ibid. The Surgical Treatment of Chronic Intestinal Stasis. *American Jour. of Gastroenterology*, July, 1913.

Ibid. Chronic Intestinal Stasis. *Maine Med. Jour.*, July, 1913.

Ibid. Remarks on Chronic Intestinal Stasis with Reference to Conditions Found at Operation and the Mortality. *British Medical Journal*, November 1, 1913.

Ibid. Chronic Intestinal Stasis. *A*, Types of Cases; *B*, Preventive and Medical Treatment Outlined. *Woman's Medical Jour.*, January, 1914.

Ibid. Chronic Intestinal Stasis Surgically Considered. *New York Med. Jour.*, January 24, 1914.

Ibid. The Preparation and After-care of Short-circuit and Co-

lectomy Patients with Drawings of Illustrative Cases of Chronic Intestinal Stasis. *International Journal of Surg.*, April, 1914.

Ibid. Fluoroscopic and *X*-ray Diagnosis in the Light of Operative Findings, with Illustrative Cases. *American Journal of Röntgenology*, September, 1914.

Ibid. Human Plumbing—Amelioration and Cure of Chronic Intestinal Stasis (Illustrated). *Charlotte (N. C.) Medical Journal*, October, 1914; also Trans. of the North Carolina Medical Society, 1914.

Ibid. Operative Findings in Twelve Cases of Chronic Intestinal Stasis. Amer. Jour. of Obst., January, 1915.

Ibid. Chronic Intestinal Stasis—Fluoroscopic and *X*-ray Diagnosis in the Light of Operative Findings, with Illustrative Cases. *Jour. of Michigan State Med. Soc.*, March, 1915.

Ibid. The Operative Treatment of Chronic Intestinal Stasis. *United States Naval Medical Bulletin*, vol. ix, No. 2, 1915.

ECLAMPSIA AND ITS TREATMENT.

BY

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In 1911 Dr. Reuben Peterson, in a paper read before the American Gynecological Society, gave an elaborate and enthusiastic brief for the surgical treatment of eclampsia with especial emphasis on the use of vaginal Cesarean section. His work on this paper included a careful study and compilation of statistics from a large number of clinics in various countries. In 1912 Dr. E. Gustav Zinke prepared a critical review of the same subject, with an equally strong brief for the medical or expectant form of treatment of this disease.

Dr. Peterson, agreeing with Halbertsma, Bumm and others, taught that a woman in antepartum eclampsia should be delivered immediately after the first convulsion. Dr. Zinke, in agreement with Stroganof and others, claimed a lower death rate from the expectant plan of treatment. In the analysis of statistics which he presented, Dr. Peterson claimed a maternal mortality of about 17 per cent. where there was prompt delivery and of about 28 per cent. under the conservative plan; Dr. Zinke, in his analysis, claimed a maternal mortality of only 12 per cent. in cases which were treated expectantly. In computing the infant mortality in Peterson's tables all children weighing less than 2000 grams and all children born before the eighth month, or those known to be dead at the time of the operation, were omitted. With these exclusions he found the infant death rate to be 23 per cent. in cases of operative delivery and 25 per cent. in spontaneous delivery. Dr. Zinke gives a fetal mortality of 46 per cent. without stating any conditions.

Both of these arguments are interesting, but each one carries with it the message of no alternative. One can but wonder what the effect of such a debate must be on the profession at large. Does not such a discussion between radicals tend to confine rather than to broaden our consideration and treatment of these cases? I am convinced that the upholders of each side of this question have misled us, or rather that we are prone to be misled. Anxious to present one element of their treatment in its most favorable light,

they have so emphasized that particular point that the all-important middle ground has been more or less lost to sight. For a long time I have felt that many patients with eclampsia failed to survive, not alone because of the disease, but often because of the treatment they received. Strenuous argument over a difference of opinion on some one feature of the treatment attaches too much importance to that particular point and frequently causes us to neglect some of the other and equally essential elements in the proper care of these cases.

The chief factors in the determination of the treatment of any disease are etiology and clinical manifestations. Rational therapeutics is based on these and must embrace the prophylactic, the curative and the restorative. How can the above-stated principles of therapeutics be applied to the subject of puerperal toxemia and eclampsia with the greatest benefit? The answer to that question must, of course, be more or less equivocal. In the light of our present knowledge of the pathology and symptoms of this disease we have been obliged to change some of our earlier ideas and to modify, in many ways, our methods of treatment. Chloroform, a widely used therapeutic agent in the past, is now known to be exceedingly dangerous; it has probably killed many patients who otherwise might have lived. By way of illustration let me tell you of a case described to me a few days ago:

A primipara, living about 20 miles from a hospital, was taken with convulsions. She was nearly at full term. The physician placed her in a car and hurried with her to a hospital. On the way she had a number of convulsions and was kept under the influence of chloroform till she reached the hospital. She was immediately delivered by manual dilatation and forceps. Duration of operation one hour. The patient died an hour later.

Approaching the consideration of prophylaxis, we find that, although we have no knowledge of the particular toxin and are thus barred from using any specific preventive measure, we are able in nearly all cases to avoid anything more than some slight manifestation of toxemia. You will notice that I qualify that statement. There are some cases which are evidently incapable of maintaining a balance of elimination throughout a pregnancy. In these cases there is, in spite of the most watchful care, either eclampsia or death and abortion of the fetus before the second period of the pregnancy.

There are other cases where the patient may have eclampsia *without showing any evidence of the preliminary toxemia.* In these it

almost seems as though there was a sudden flooding of the circulation by an accumulation of toxin. Case 11 of my table was one in point. The patient was the wife of a physician who was not only well qualified to detect any evidence of preeclamptic toxemia but exercised those qualifications with remarkable fidelity. For a considerable portion of her pregnancy and for a number of weeks before labor he made complete analyses of twenty-four hour urine each day. Frequent blood pressure and cardiac records were made, all of this being done because of some old and indefinite myocardial trouble. This patient developed eclampsia during labor and, within six hours, had nine convulsions after which she made a satisfactory recovery. The first evidence of toxemia observed was a slight headache about two hours after the onset of labor. At this time blood pressure registered 127. During the following half hour constant readings were taken, which showed a steady rise until it reached 165 when, as dilatation was almost complete, I gave orders for a forceps delivery. One convulsion occurred while she was being prepared for the forceps delivery, blood pressure 168.

Generally speaking, our prophylaxis consists in maintaining all physiological functions at their highest efficiency, but we must particularly watch those of digestion and elimination. A liver with an extra load to carry should be assisted in every possible way, for the large and unnecessary amount of toxin due to faulty digestion and improper diet may be the deciding factor in the production of eclampsia. Further, I do not think the question of muscular exercise has been sufficiently considered. Muscle action gives rise to fatigue toxin which, in sufficient amount, causes more or less severe reactions. I have seen patients develop eclampsia shortly after unusual muscular activity.

In the presence of active eclampsia, what measures shall we use to combat so dangerous a condition? There is, perhaps, no question which is put to me oftener than this one: "What are your rules for the treatment of eclampsia?" That is a difficult question to answer, for in spite of all our efforts to standardize our methods it is still a hand-made process and I have yet to make a set of rules for any case that I have not modified more or less subsequently. In general, we know two things: First, that the patient is suffering from a poisoned blood stream; and second, that, though the character of this poison is unknown, it depends on the pregnant condition. We thus have two indications for treatment: neutralization of the toxin already present, and removal of the cause or source of the poison. The second proposition, the removal of the cause which, of course, means

the evacuation of the uterus, is the one upon which there is the greatest difference of opinion. Theoretically it is the ideal form of treatment. Practically it is so in some cases, but in many it is not.

I feel that there are certain favorable cases in which the prompt evacuation of the uterus forms the most rational form of treatment, operative delivery must be undertaken with the greatest caution and but I am equally sure that there is a large number of cases in which then not before the patient has had the benefit of preliminary treatment and has been put in the best possible condition for the operation.

The attending physician and the circumstances surrounding the patient are important factors in the choice between medical and surgical treatment of eclampsia. The general practitioner is the man who has these cases. He it is who, with the midwife, does the obstetrical work of the community, and he as yet fails to realize the great importance of prenatal supervision of these women. I think you will agree with me that the average physician, busy with his general practice, is not the one to give an eclamptic patient the best surgical attention and, also, that a patient far from a hospital is not in a position to receive the best surgical care. On the other hand, when a patient is in or not far from a hospital or where the services of a well-trained obstetrician may be readily secured, the surgical treatment of eclampsia deserves a large share of consideration.

What place should the life of the child have in our discussion? The safety of the mother is, of course, our first consideration, but when the baby is living, with a reasonable chance for life, it is entitled to serious consideration if that consideration can be given without detriment to the mother. Unfortunately, the fetal mortality in puerperal toxemia and eclampsia is very high. There are several reasons for this chiefly, intrauterine asphyxia, premature birth and injury during delivery. Do the dangers of intrauterine asphyxia under the expectant plan offset the dangers in an operative delivery? I doubt if there are sufficiently reliable statistics upon which to base any positive conclusions on this question, but it seems to me that, in the absence of a highly skilled obstetrician, both mother and child have a better chance with conservative rather than radical treatment. If the mother is in such a condition that delivery is imperative I apprehend that, in a large proportion of cases, she will not survive the delivery no matter how it is accomplished.

Under any conditions I feel that our first and most earnest efforts should be directed toward an efficient elimination of toxins. While one is planning and performing an artificial delivery the toxin that has already accumulated may do damage which cannot be repaired. For this reason the first emphasis should be placed on a thorough washing of the circulation. This may be done by catharsis, hot packs, colon irrigations or by bleeding, but, at the same time, a proper circulatory volume should be maintained by water given by mouth, or by the rectum, or by properly prepared solutions given intravenously. The solution of sodium chloride with sodium carbonate, Fischer's solution, is probably the best for this purpose.

Attention is here called to the work done by Dr. E. A. Graham, of Chicago, with agents causing focal necrosis and hemorrhage in the liver. His experiments were made with chloroform as the toxic agent. There is a great similarity between the pathological findings in these cases of chemical poisoning and those in cases of eclampsia and many other severe toxemias. Thus the question naturally arises: Is this cellular lysis in the liver the final expression of one agent or is it due to a number of different agents? Do these various agents, be they chemical or bacterial in their origin, fuse into a single substance in their breakdown and thus become the single agent of destruction in the liver; or do these several toxins act in a similar manner to produce the same liver changes? Dr. Graham has shown that a number of different agents such as chloroform, iodoform, and bromoform give rise in the body to a corresponding halogen acid, and that these acids will produce the same definite changes in the liver, viz., edema, fat accumulation, multiple hemorrhages and lobular necrosis.

Graham was also able to produce the same morphological condition in the liver by the direct introduction of acid into the circulation. His conclusion is that these toxic agents, in the process of their dissociation, produce the acid which in turn causes the liver changes. This seems to be borne out by further tests whereby he was able to control or inhibit the changes in the liver by the use of sodium carbonate in salt solution. This is suggestive of the value which may attend the use of Fischer's solution intravenously. We have long recognized the serious aspect of the acidosis which is the final expression of these toxemias, and an agent which will either prevent or neutralize that toxic acidosis must be of infinite value.

The further treatment of these cases depends, more or less, on the case in hand. In cases of unusual severity or in those where, for other reasons, it may seem advisable to empty the uterus, I make my

plans for the operation while the blood stream is going through the laundry. Whether the delivery shall be done rapidly, or labor induced by the introduction of a bag, depends on the nature of the case. I have no fixed rule. For that reason the following list of cases shows all forms of delivery and a variety of medical treatment. In a large measure the medical treatment has consisted of magnesium sulphate, colon irrigations, hot packs, bleeding to the amount of 400 to 500 c.c., followed by a saline and alkaline infusion of about 1000 c.c.

The list of cases is too short to be of great value, nevertheless it shows the importance of a careful study of the individual case. The results would not have been as satisfactory if I had treated every patient in the same way. One must fit the treatment to the patient and not the patient to the treatment. Any plan of treatment which does not take into consideration all of the elements of the case at hand is not rational. The use of sedatives such as chloroform, morphine and chloral for the purpose of controlling the convulsions has never seemed to me a rational procedure. A very good reason why chloroform should not be used has now been discovered. Good results from the use of morphine have been reported, but it has always seemed to me that in its use we were working directly against the object we should be trying to attain, viz., elimination. I know that there are many cases so restless and maniacal that they need sedation, but in these I prefer to use chloral and bromide with moderate mechanical restraint, and depend on the eliminative treatment to overcome the restlessness.

I must call attention to the continued observation of these cases after recovery from the acute illness. Most of them have a more or less pronounced hemolysis and a rather persistent anemia, and the renal disturbance is often of obstinate character. They should be kept under close observation for many months. The physician's work is not done until the patient's health is restored.

ANALYSIS OF TABLE.

In studying the table the following facts are to be noticed: There were twenty-one cases with a total maternal mortality of 9.5 per cent. and a total fetal mortality of 28.5 per cent., or if the same exclusions were made as in Dr. Petersons's tables the fetal mortality was only 9.5 per cent. In fourteen cases, or two-thirds of the whole number, convulsions developed before delivery, and in seven the convulsions developed after delivery. Of the fourteen antepartum cases, ten continued to have convulsions after delivery, so that delivery did not

prevent or stop the convulsions in 80 per cent. of all cases. There were eleven operative deliveries and ten spontaneous ones. One mother died after a spontaneous delivery and one after a manual dilatation and version. Of the children who were alive or viable at the time of delivery, one died after spontaneous birth and one after version, while the others were all stillborn before the thirty-second week. In the operative cases the delivery was done in one case before convulsions appeared; in one after the second attack; in one after the third seizure; in three after the fourth convulsion; in two after the fifth; in one after the eighth, and in one after the ninth. In all cases but one the kidney manifestation was present in varying degrees. Hypertension was a common feature, although the cases that died had a lower pressure than the others.

	Name	Convulsions		Kidney manifestation	Blood pressure	Method of delivery	Result	
		Ante-partum	Post-partum				Mother	Child
1	Mrs. H.	0	11	XXX	200	Spontaneous	Good	Good
2	Mrs. L.	0	12	X	170	Spontaneous	Good	Good
3	Mrs. K.	0	9	X	176	Spontaneous	Good	Good
4	Mrs. M.	10	0	XX	185	Spontaneous	Good	Good
5	Mrs. N.	9	2	X	175	Man. dil., version	Good	Good
6	Mrs. P.	Many	Many	XXX	130	Spontaneous	Died	Good
7	Mrs. C.	0	4	X	157	Spontaneous	Good	Good
8	Mrs. D.	5	5	XXX	160	Man. dil., version	Died	Stillborn
9	Mrs. G.	4	2	X	160	Low forceps	Good	Good
10	Mrs. Z.	0	1	XXXX	200	Cesarean section	Good	Good
11	Mrs. H.	2	7	.....	168	Low forceps	Good	Good
12	Mrs. W.	0	9	X	?	Spontaneous	Good	Good
13	Mrs. A.	10	5	X	?	Spontaneous	Good	Stillborn 27th week.
14	Miss S.	3	0	X	200	Med. forceps	Good	Good
15	Mrs. C.	0	4	X	180	Spontaneous	Good	Died
16	Mrs. M.	4	10	XX	?	Bag dilatation, med. forceps	Good	Good
17	Mrs. W.	8	1	X	?	Spontaneous	Good	Stillborn 29th week.
18	Mrs. H.	4	0	XXXX	184	Bag dil., eighteen hours, vag. Cesarean	Good	Good
19	Mrs. C.	8	2	XXX	190	Vaginal Cesarean	Good	Stillborn 30th week.
20	Mrs. F.	5	0	XXX	204	Vaginal Cesarean	Good	Stillborn 28th week.
21	Mrs. D.	3	2	XX	180	Man. dil., version	Good	Good

THE TRANSPOSITION OF THE BLADDER AND UTERUS FOR THE CURE OF CYSTOCELE AND DESCENSUS UTERI.

BY

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THE operation of transposition of the bladder and uterus has been variously catalogued. Formerly the names of the men who originated the procedure were applied to it, but more recently names have been given which describe the operation anatomically. In the literature it is known as the Freund, the Dührssen, the Mackenrodt, the Watkins-Wertheim, the Watkins, or the Schauta-Wertheim operation. It is also designated as the operation of interposition of the uterus; the operation of transposition of the bladder and uterus; and, sometimes, as the operation of vaginal fixation of the uterus.

The operation of transposition of the bladder and uterus, as performed at present, brings the body of the uterus entirely out of the peritoneal cavity and fixes it to the anterior vaginal wall under the bladder. It may be said to be a development from the vaginal fixation operation of Mackenrodt and Dührssen.

The original operation of vaginal fixation of the body of the uterus was intended entirely for the correction of retroposition of the uterus; but our present operation of transposition of the bladder and uterus, while correcting the position of the uterus, has for its object the cure of cystocele and prolapsus uteri.

As the operation of transposition of the uterus and bladder has developed from the vaginal fixation operation, it is necessary that our history should begin with the earliest publication of the principle of vaginal fixation.

In 1888 Schücking(14) did the first vaginal fixation operation. He introduced sutures without the aid of an incision through the anterior vaginal wall and through the anterior surface of the uterus, avoiding the bladder. He did this by the aid of a special trocar and needle. The bladder, however, was often injured and his results were not permanent.

In the same year Sänger(13) suggested that the anterior vaginal wall be incised, the bladder pushed upward and the uterus pulled forward and sutured to the anterior vaginal wall below the bladder.

It is not until May 27, 1892, that we have evidence that Sänger's suggestion had been acted upon. At this time Mackenrodt(11) published his operation of vaginal fixation. He made a vertical incision from the cervix upward, separated the bladder from the vagina and uterus and sutured the anterior vaginal wall directly to the uterus above the internal os.

In the same year, but one month later, Dührssen(3) published a similar operation, but made a transverse instead of a vertical vaginal incision, suturing the vagina transversely to the body of the uterus under the bladder.

In both of these operations the sutures were first placed rather blindly into the uterus and too low to exert sufficient leverage to hold the uterus forward. Attempts were therefore made to secure a higher vaginal fixation by stripping the bladder and peritoneum from the uterus well on to the fundus. This gave a greater leverage to the sutures and was more successful.

Küster(10), in 1894, was the first to make the opening of the peritoneum a routine part of vaginal fixation(19).

In the same year Dührssen(4) opened the peritoneum and placed his fixation sutures high through the fundus, but closed the peritoneum before tying these sutures that the fixation might not be too firm and cause dystocia.

As vaginal celiotomy was done more frequently in connection with vaginal fixation, it was realized that adhesions and other pathological conditions in the pelvis were frequently the cause of recurrence after vaginal fixation. The pathology was therefore corrected by the vaginal route.

However, the higher and firmer vaginal fixation, secured by opening the peritoneum, while not so frequently followed by recurrence, soon resulted in serious dystocia and the death of patients. The result was that operators either tried to make the procedure more of a suspension than a fixation or abandoned it for some other operation.

To overcome the danger of dystocia Mackenrodt adopted the operation of vesico-fixation of the uterus. He did this by freeing the bladder entirely from the uterus, opening the peritoneum and reinserting the peritoneum and bladder high on the uterus without fixing the uterus to the vaginal wall.

In 1896 Vineberg(18) and Wertheim(21), attempting to find a

method of vaginal fixation free from the danger of dystocia, performed the first operations of vaginal shortening of the round ligaments. Both of these men have also devised operations for vaginal fixation of the round ligaments.

Although the vaginal shortening of the uterosacral ligaments had been done as early as 1888, yet the desire to find a vaginal operation which would give permanent correction of retroposition of the uterus without dystocia led Gottschalk(9) and Bovee(2) to devise the more practical methods of vaginal shortening of the uterosacral ligaments in use to-day. The operations were done both by the intraperitoneal route and, also, from within the vagina by dissecting the ligaments from the sides of the cervix and suturing them together in front of it.

At this time another operative principle was brought out by Alexandroff(1) and Tweedy(17). They freed the bladder from the uterus and elevated the base of the bladder as far as the ureters. They then united the broad ligaments, with a part of the parametrium, in front of the uterus. Tweedy opened the peritoneal cavity behind the cervix in order to push the broad ligament forward. The uterosacral ligaments were utilized in the operation. They claimed the correction of the retroposition, cystocele and prolapse and also the elevation of all the organs in the pelvis.

So strongly were certain operators impressed with the idea of correcting retroposition of the uterus by vaginal celiotomy that attempts were even made to fix the uterus to the anterior abdominal wall by this route. Injury to the bladder, however, made the life of this procedure a short one (Wertheim)(22).

Such is the history of the operation of vaginal fixation for the correction of retroflexion. The attempts to improve it, and to avoid its dangers, led to many other procedures and had considerable to do with the development of vaginal celiotomy. Recurrences, however, were common; dystocia was serious and bladder disturbances were not to be ignored, and, as we all know, vaginal operations for the correction of retroposition alone are now rarely undertaken.

The history of the operation of transposition of the bladder and uterus began with the work of Dührssen(5) in 1894. He was the first both to do and to publish the operation, although he did not at first receive the credit for it, as his description was hidden in an article giving the technic of several other vaginal operations.

In 1896 Freund(7) performed and described an operation which, while it transposed the uterus, accomplished it in a different manner than is done at present. He opened the culdesac by an incision posterior to the cervix, pulled the retroflexed uterus into the vagina

and, after making a drainage opening in the fundus, sutured it between the anterior and posterior vaginal walls.

Fritsch(8) at a slightly later period came nearer to our present procedure. He made an incision anterior to the cervix, delivered the uterus into the vagina and sutured the vaginal wall to the cervix, leaving the fundus free in the vagina to act as a sort of permanent pessary under the bladder.

In 1899 Watkins(19) published an article with the description of an operation and with a report of three cases which differed very little from the operation of transposition as it is done to-day.

In the same year (1899) Wertheim(23) published a transposition operation very similar to that used at present, except that he did not cover the anterior surface of the uterus entirely with vaginal wall, but left some of the fundus exposed in the vagina.

Stone(16), 1899, read an article which was published in 1900 and described quite clearly the principles of the transposition operation.

Schauta(15), also in 1899, described the general principles of the operation and claimed that he had used them since 1889.

Numerous other men have done much to develop and popularize the operation in this country; among them are Bandler, Byford, Goffe, Frankenthal and Polak.

The operation of transposition of the bladder and uterus therefore, while first published by Dührssen in 1894, really had its origin in about the year 1899, and developed, independently, in the minds of several men.

The transposition operation is intended for the cure of cystocele or moderate prolapse after the menopause, or in women in whom pregnancy is inadvisable, improbable or impossible. The operation is absolutely contraindicated in women who are likely to become pregnant, or who are suffering from uterine carcinoma. The operation is usually not successful in cases of complete uterine prolapse, or where the uterus and its ligaments are greatly atrophied.

If, when performing this operation, the fundus comes into the vagina with difficulty and can be sutured to the anterior vaginal wall only under tension, the operation is contraindicated and it is probable that a less radical procedure will serve the purpose better.

J. O. Polak(12) is authority for the statement that cases of prolapse, with sliding in the postpubic plane, are not corrected by the transposition operation.

The advantages of the operation are that it is simple, safe, quickly done, and very effective. It is much the simplest operation in fat women and offers a satisfactory cure to certain elderly women who

could not reasonably be expected to endure even a vaginal hysterectomy. The operation can even be done under local anesthesia and, finally, if the operation should fail, nothing has been removed which will make hysterectomy or other more radical procedure impossible.

The ordinary details of the transposition operation are so well known that only certain features need to be discussed in this paper.

The incision in general use is a long vertical one with a short transverse one over the cervix. This lends itself readily to the complete freeing of the bladder, the amputation of the cervix, and to the removal of the necessary amount of the anterior vaginal wall.

The radical separation of the bladder from the vagina and uterus is, undoubtedly, a very important step. Other operations for cystocele were not generally successful until the bladder was freed and reimplanted higher on the uterus. Moreover, aside from recurrence, the question of bladder function is important. Unless the bladder is separated sufficiently from the vagina, uterus and broad ligament, pockets will form in the base of the bladder which will result in imperfect emptying of the organ. This is especially likely to occur where the base of the bladder is held down to the uterus and broad ligament by the so-called pillars of the bladder. These pillars should be double ligated and cut. If this is not done, the body of the uterus in its transposed position will lie between these fixed points and raise up the bladder except at the points where it is held down by the pillars. The tendency is, moreover, as in the post-prostatic pouch, for these pockets to grow larger as time goes on. It is undoubtedly true that postoperative urinary symptoms have done much to discredit the transposition operation. However, if the operation is properly done and the after-care is attended to, these symptoms can be largely avoided.

Dührssen(6) advised separating the bladder until the ureters came into view, while Watkins(20) in his more recent writings reports that he does not find it necessary to free the bladder so completely as he formerly advocated. He says that too free loosening of the bladder leads to troublesome hemorrhage and to other complications.

It has been pointed out that a too extensive freeing of the bladder may lead to a contraction of the anterior vaginal wall with a drawing forward of the cervix, a condition which would tend toward a recurrence of the prolapse.

The troublesome bleeding from the uterus and broad ligament encountered in the operation can best be controlled by sutures placed

at the sides of the cervix ligating the vessels coming from the vagina.

The incision of the peritoneum between the bladder and uterus should be transverse and of ample extent. Upon this depends the easy bringing up of the body of the uterus and the careful examination of the adnexa. The incision in the peritoneum is immediately closed about the posterior wall of the uterus after the fundus is delivered and the adnexa examined.

If the operation is being done in a woman who may become pregnant the inner ends of the tubes should be resected, provided there are good and sufficient reasons why the woman may be sterilized. This is done in such a way that the tubes are left in the peritoneal cavity while the uterus becomes extraperitoneal.

The fixation of the uterus is usually made to the anterior vaginal wall so closely under the symphysis that the bladder cannot escape. Polak advises fixing it to the fascial plate behind the pubes and not under the arch. It has been customary to use several fixation sutures of chromic catgut or some nonabsorbable material to hold the uterus securely against the anterior vaginal wall or to the firm tissue near the pubic rami. Watkins advocates simply making the running stitch of chromic catgut, which closes the vaginal wall, include the anterior surface of the uterus.

The amputation of the cervix may or may not be necessary. Its object is to remove a diseased cervix, lighten a heavy uterus and elevate and fix the vaginal wall, along with the fibrous tissue of the parametrium and the adjoining fascial layers, securely to the uterus. If the uterus is to form a part of a sort of swing suspended between the pubic arch and the sacrum, and if it must also fill the hernial opening through which the bladder has escaped, it is not wise to diminish its size too much by any unnecessary amputation.

Bandler's method of amputation of the cervix is an effective one. It is carried out in such a manner that a considerable amount of the vaginal wall from the front and sides of the cervix is removed. It is claimed that this narrowing of the vaginal vault makes prolapse less likely to occur.

A procedure which would seem to be of considerable value in the transposition operation is the shortening of the uterosacral ligaments. With the fundus of the uterus secured to the anterior vaginal wall or to the pubic arch, the uterosacral ligaments form the attachment to the sacrum and complete a sort of hammock suspended from the pubes to the sacrum and supporting the pelvic viscera.

When recurrences appear after the transposition operation it is

usually the cervix and not the fundus which comes down first. This indicates a giving away of the structures which hold the cervix up and back, important among which are the uterosacral ligaments.

There are several ways of shortening the uterosacral ligaments by the vaginal route during the operation of transposition. They may be plicated within the peritoneal cavity at the time that the adnexa are examined, or they may be drawn through the broad ligament and sutured in front of the cervix. Also, working outside the peritoneal cavity, they may be dissected from the sides of the cervix and sewed together in front of it.

If the body of the uterus is too large, it forms a contraindication to the transposition operation unless it can be reduced in size. If the enlargement is due to an endometritis, or to congestion, it should be attended to by appropriate means before the operation. If it is due to fibroids, or simple enlargement, the uterus should be reduced by myomectomy or partial resection, if it seems feasible and when there is no other complicating pathology. If desirable, the entire endometrium may be resected. This does away with many complications and enables one to definitely rule out carcinoma.

The operation of transposition should, of course, always be followed by a secure perineorrhaphy which narrows the vagina as much as is consistent with the age and sexual relations of the patient.

Drainage will be necessary in some cases, especially where the bladder has been extensively freed. Watkins reports that he no longer uses drainage, and if blood does collect under the flaps, he elevates the head of the bed and applies hot, moist compresses to the perineum.

Owing to the frequency of bladder trouble after this operation, all precautions should be taken in doing the operation and in the after-care. It has been my custom in these cases, as long as the patient has needed catheterization or as long as she has had any residual urine, to have the bladder washed out once a day with a weak solution of silver nitrate. This has prevented the development of acute cystitis, or has corrected the chronic cystitis which already existed.

There are several procedures in which the principle of the transposition of the uterus and bladder is used. One of these is a modification of the Le Fort operation. The mucosa of the uterus and cervix is entirely excised and the uterus is fixed under the bladder to the pubic arch. The vaginal mucosa is then completely removed and the canal obliterated.

In vaginal hysterectomy for prolapse the principle of transposition

is also used. The stumps of the broad ligament are now commonly sewed together and fixed under the bladder to the anterior vaginal wall. This procedure I have found applicable in a rather larger percentage of cases than the transposition operation, as I have been unwilling to do the latter operation in cases of complete prolapse, especially, with an atrophic uterus. I have found the operation very satisfactory so far as the cure of cystocele is concerned; but I have been annoyed in several cases by a prolapse of the vaginal vault. This I have recently overcome by fixing the uterosacral ligaments securely in the upper end of the vagina. The uterosacral ligaments are especially easy to isolate in the form of vaginal hysterectomy which turns the fundus of the uterus forward into the vagina, severing the broad ligaments first and leaving the cervix until the last. Just before the cervix is cut free, firm tension is made on the uterus bringing the ligament into prominence, and a clamp is placed on the cervical end of each uterosacral ligament including more or less of the parametrium. The ligaments are then secured in the vaginal vault during the closure.

CONCLUSIONS.

I. The operation of transposition of the bladder and uterus developed from the operation of vaginal fixation.

II. Vaginal fixation aided in the development of vaginal celiotomy and was directly responsible for vesico-fixation of the uterus and for vaginal fixation and vaginal shortening of the round and uterosacral ligaments.

III. Vaginal fixation has been discarded on account of recurrences and dystocia.

IV. The history of the transposition operation really began in 1899, although it was first published by Dührssen in 1894.

V. It is an operation for the cure of cystocele and incomplete prolapse, in women who cannot become pregnant.

VI. It is a simple, safe and effective operation in properly selected cases.

VII. The radical freeing of the bladder and its proper care after the operation are essential to success.

VIII. The operation is applicable in a smaller number of cases than vaginal hysterectomy for prolapse.

IX. The shortening of the uterosacral ligaments is an important feature of the operation.

X. The principle of transposition is now applied in several operations including vaginal hysterectomy.

BIBLIOGRAPHY.

1. Alexandroff. *Zent. für Gynäk.*, Leipzig, 1903, xxvii, p. 762.
2. Bovee. *Jour. Amer. Med. Assoc.*, July 5, 1902.
3. Dührssen. *Centralb. für Gynäk*, 1892, p. 924.
4. Dührssen. *Berl. klin. Wochenschr.*, 1894, Nos. 29–30.
5. Dührssen. *Arch. für Gyn.*, xlvii, H. 2, p. 285.
6. Dührssen. *Surg., Gyn. and Obst.*, iv, 585.
7. Freund. *Centralb. für Gynäkologie*, xx, 1009.
8. Fritsch. *Centralb. für Gynäk.*, xxiv, 49.
9. Gottschalk. *Centralb. für Gynäk.*, April 18, 1896.
10. Küster. *Deutsch. Med. Wochenschr.*, 1894, No. 19.
11. Mackenrodt. *Berl. Gyn. Soc.*, May 27, 1892.
12. Polak. *Jour. A. M. A.*, lxii, p. 1988.
13. Sänger. *Centralb. für Gynäk.*, 1888, No. 2, 34.
14. Schücking. *Centralb. für Gynäk.*, 1888, No. 12.
15. Schauta. *Wiener Gynäk. Gesell. Trans.*, März 21, 1899.
16. Stone. *Amer. Gyn. and Obst. Jour.*, N. Y., xvi, p. 9.
17. Tweddy. *Jour. Obst. and Gyn. Brit. Emp.*, Lond., 1905, xii, p. 349.
18. Vineberg. *Med. News*, March 14, 1896, 288.
19. Watkins. *Amer. Gyn. and Obst. Jour.*, N. Y., 1899, xv.
20. Watkins. Amer. Jour. Obstet., lxv, 228.
21. Wertheim. *Centralb. für Gynäk.*, March 7, 1896.
22. Wertheim. *Centralb. für Gynäk.*, Jan. 11, 1896, No. 2.
23. Wertheim. *Centralb. für Gynäk.*, xxiii, 369.

WOUND DRESSINGS.

BY

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In order to study wound healing, the writer of this paper took, charge of a surgical clinic which furnished a minimum of twenty septic patients per day with as many additional ones as he could attend in the time at his disposal. Unhealed laparotomies and other operative wounds, gangrene, burns, lacerations, contusions, punctures, incisions, railroad, machinery and traffic accidents and their consequences would make up most of the list of cases. A battlefield, after a cavalry charge, would give a fair picture of the state of things which was encountered. For there the least injuries would be those inflicted by the saber and rifle, but human flesh would be smashed out of semblance by the flying and contaminated hoofs of the troophorses, or would be crushed and poisoned by the mud-befouled rim of the rolling wheel of the light artillery, and of the ammunition wagon.

Many septic cases came together, because experience with non adherent bandages resulted in one appreciative patient bringing some injured friend with him on his return to the clinic. To quote a nurse "The nonstickers became stickers," meaning that the patients remained under observation until recovery was complete. Those who did wander, as such people invariably do, only required to have an adherent dressing torn off an unhealed wound in some other clinic, or elsewhere, and they came back without hesitation.

Boils and carbuncles furnished three essentials for study, viz., infection, suppuration and necrosis. To make two boils grow where one grew before, or to make a ring of satellites about a center, one had but to scratch the adjacent skin, cover with a flaxseed poultice and leave the rest to nature. They proved to be excellent examples of local pyogenia, which was aggravated or endurable according to a bad or good bodily state. A number of able surgeons have considered that the application of a chemical antiseptic to an infected

wound is of small value; to this I agree, at least to this extent: In my experiments any antiseptic which would not arrest a boil was not considered worth trying in the depths of an infected wound, and its laboratory antiseptic index proved to be but a poor guide to its clinical employment, if its application irritated, and thus hastened, the course of a boil. To quote one of the House Staff: "If you get a boil with your antiseptics you get it quick, or you don't get it." His meaning is quite correct. Anyone who is treating an infection is either making it better or worse.

Consumers of large quantities of cheese almost invariably went to the bad, when they left the hospital for home. Both boils and wounds seemed to resent this article of diet. Its heavy charge of nitrogen, or something else, acted disadvantageously despite all and numerous favorable reports upon its great food value. Lemon juice and orange juice were beneficial both locally and internally. Mineral acids, calcium sulphide, etc., gradually were supplanted by the old-fashioned syrup hypophosphite compound cum ferro, and this appeared to deserve the high repute in which it was held by our forefathers. When lemon juice with soda bicarbonate (or citrate of soda plus carbonic acid) stopped a boil after bichloride had scored a failure, then one was shocked, and the idea was brought home that possibly the "Antiseptic Index," as compiled from the findings of the test-tube and Petri dish, might read backward when tried at the bar of clinical experiment and upon septic human flesh.

If the patient must return to a tenement house environment, before recovery is absolute, then the nearer the operator's incision approaches the vertical, the better. Infected Pfannenstiel incisions proved slow of healing. Celluloid linen irritated tissues much more than plain material. Large sizes of catgut were a nuisance. The Pagenstecher ligature could usually be lifted up, the loop cut and the whole pulled out, but the catgut, when macerated, would frequently leave unobtainable pieces behind. One woman said that the silkworm-gut stitches in her cervix had been there for a year. They were removed and apparently had not caused any trouble. Union was good. Two laparotomies cast out silk stitches months after an apparent healing. Finer or firmer cicatrices could not reasonably be expected. Wounds with their blood-vessels ligated with catgut and the whole closed with silk in every instance showed deep infection first and, presumably, it started in the catgut, but whether the catgut was plain or antiseptic there was no way of determining.

Tracing the source of things with patients coming from different hospitals, cities and states proved futile and was early abandoned. This paper gives findings, merely. The use of absorbent suture material is something each operator must settle for himself. I am using catgut, but am also looking for the arrival of a day when its use will be abandoned, possibly with the same rapidity which marked its adoption. If linen thread is treated by frying at 340° F. or over, or small-sized catgut is immersed in biniodid of mercury, iodin, glycerin, and alcohol for thirty or forty days, there is no fear of their containing germs. It may be easily anticipated that those germs which can withstand boiling, in spore form, do not stand an additional 130° of heat. All stitch fistulæ and postoperative herniæ followed the use of catgut, the all but universal use of which rendered contrast with other material impossible.

Three things tended to prevent primary union: 1. Stitch traction with more or less necrosis. 2. Irritation, including the caustic and tanning powers of iodin. 3. Healing tissues are embryonic and fair game for infection or malignancy.

As to the first. It is hard to understand why someone has not used Dr. Alfred H. Gould's reverse mattress stitch to close fascia or aponeurosis (see Operations on the Intestines, page 85, for description). The needle is inserted twice toward the incision and twice away from it. The result is a sort of square purse string that will not pucker, but pulls flat. In other words, it is a perfect reinforcement to the central stitches. In regard to No. 2. Let anyone make two cuts or incisions, paint one with tincture of iodin and the other with boiled water. Barring infection, that person will discover that the iodin test does very well, indeed, if it only takes twice as long to heal as the other. Iodin tanning is something like the mechanical device called the pulley—speed is sacrificed for efficiency. Suppose water containing 20 per cent. of glycerin be used to dilute the tincture of iodin to ℥i of the latter in ℥i of the mixture, then we find the tissues no longer becoming stiff and friable after its application. Suppose, again, that we have added calomel one part to tincture of iodin 1000 parts. Just what the chemical result is, is a matter of difference of opinion on account of the presence of potassium iodid. It has been called a biniodid of mercury, a tetraiodid, etc., but the germicidal power is increased tenfold for clinical or wound work and twentyfold for laboratory or test-tube work. This does not mean that it is inefficient in weaker solutions, because it is efficient, but the figures are easy and convenient to use. Let the skin wound be filled with the aforesaid

solution just before fastening the subcutaneous stitch. Then fasten that stitch, wash all off with a saturated solution of perborate of soda and make the outlook for primary union excellent.

Some wounds refuse to heal until peroxid cleansing is discontinued. The offending element in the commercial solution of peroxid appears to be sulphuric acid, a preservative addition. At least dry red-edged wounds are sequential upon the application of dilute sulphuric, and absent when the H_2O_2 solution is neutralized with bicarbonate of soda.

Patients, said to be 95 per cent. well when sent home from various hospitals, had applied iodin or peroxid, or both, for various periods up to ninety days and then they came into my hands with skin tanned or destroyed, with the depths of their wounds furnishing a purulent discharge or with gaping cuts filled with fungoid granulations. Prima facie appearances warranted the query: "If no antiseptic had been employed would the ultimate results not have been better?" It is easy to fill a wound with the peroxid solution and, upon a probe introduced right through the bubbling mass, obtain vigorous cultures. The solution is only a cleanser and, if neutralized just before using, does not do much damage. But ask any genitourinary man what a pleasant time he has in cleaning up after a general practitioner has thoroughly and persistently used H_2O_2 in the male urethra. Ask him which has made that urethra the sorer, the remedy or the infection?

A chemist, engaged in the manufacture of bleaching materials, brought to my office everything he required to make peroxid. We spent three evenings in our endeavors to sterilize our purposely contaminated hands. We did not find an appreciable difference between tests and controls when our cultures were developed. But we did run the strengths of our solutions up to the limits of our skin tolerance; the bleaching power was good, the antiseptic influence nil. Cleaning up an iodin-painted wound with H_2O_2 does make for healing by washing away the excess of iodin, not otherwise.

As to statement No. 3. Immediate union is, probably, impossible of acquirement, but the chances of its occurrence are increased if the dresser is as careful in his technic as was the operator. Lymph coagulated by iodin may form a shield, but not a union any more than lymph, entangled in the meshes of gauze and then torn off, can make a true seal for any wound. Attempts at asepsis which are not backed up by a trained and disciplined staff working with intelligence, in a favorable environment, are delusions, snares and myths. Antisepsis may be brought about by clumsy or careless

fingers. Asepsis never can be unless by pure chance. In short, the precautions of the dresser must never fall below the level of the operating-room standard; or if they do so fall, asepsis should be abandoned and antisepsis initiated.

Packages of wipes of the usual size may be fried for twenty minutes, laid on a sterile tray and only unwrapped after the operation is completed and the final wound cleansing with perborate of soda is begun. Then any number of such sterile (175° C.) wipes may be placed in contact with and about the closed and cleaned incision. Powders, such as thymol iodid (aristol), are neither necessary nor objectionable, and the wound may be left undisturbed until the eleventh day; or, inasmuch as the fried gauze does not stick nor its removal tear off the scab, the dressings may be removed and the wound dressed with the iodin, calomel, glycerin solution on the third, fifth, seventh, ninth and eleventh days. The former is good, though called the "lazy man's way;" the latter gives equal results because of the nonadherent bandage. Choice seems a matter of indifference and union is obtained with either method. Because iodin is widely used, I wish to know the best way to use iodin, but far be it from me to blow a trumpet for iodin. Nor do I expect anyone to admit that his results are any better to-day than they were in his pre-iodin days. The men who are using iodin are so wedded to it that the suggestion of any other substance might involve a neglect of the powerful factor of personal equation, which makes a first-class man, using a familiar but second-class method, more than equal to a second-class man employing unskilfully a first-class method. Perhaps the answer to all such questions may be found, as suggested elsewhere, in experimentation with boils rather than with test-tubes.

A mere surface disinfection and healing may permit the disadvantage of an unchecked germ propagation in the depths of a wound. A nonfistuloid and altogether better condition of affairs would be obtained by maintaining an open wound from the very start. Chemistry is not our only guide. Dr. Sexton had any number of infected vaccinations in the Willard Parker Hospital and found the local application of bacterins the very best method of treatment. This works well upon septic wounds, but the cost prevented my making more than a few dozen applications (exact number, seventy-five).

Alantoin is wonderful as a wound healer even though not at all a chemical antiseptic. Its employment is simply a putting of the active principle of embryonic tissue upon embryonic tissues. It

acts as though it made the wound furnish its own antibodies and thus clean itself. Strange to say, irritation or its absence does not sum up the whole matter, for 1 to 3000 of nitrate of silver either in kaolin or water is an irritant antiseptic and yet, at the same time, a stimulator of the healing processes.

Summary.—Fried ligatures, drains, pads, etc., do not adhere to wounds.

The nonadhesion allows of unlimited wound inspection and fosters healing.

The best way to treat wounds may be easily discovered by experimentation with boils.

If one wishes to use iodin, add calomel 1 to 1000 to the tincture and ℥i of this mixture and an equal part of glycerin to ℥i of water. This will prevent tanning and will permit penetration of the tissues.

If the patient has iodin idiosyncrasy, or if for any reason the wound does not do well, then abandon iodin at once and substitute 1 to 5000 nitrate of silver or anything else that you deem its equal.

There is just as much difference in the wound healing of two different patients as there is in two pneumonias, two typhoids, or two gouts.

Routine treatment may be all right, but frequently it is not; therefore, if the patient is to use H_2O_2 plus iodin, the results to be anticipated from his, or her, own personal application are either good or deplorable; there seems to be no middle course.

Addenda.—This paper has been cut to less than half of its original length and there is an impression that possibly the most valuable part has been pruned away. Special reference is made to three cases of iodin idiosyncrasy which are here omitted. It is enough to say about this rare condition that it does not at all resemble the iodism of the iodids (potash and soda); it is usually mistaken for surgical scarlet fever; it does not appear to attack the throat, hands or feet even while the exfoliation upon arms, legs and body is marked, and it followed the application of the U. S. P. tincture of iodin to an abdominal incision. Differentiation lies between iodin and scarlet.

MINOR SURGICAL GYNECOLOGY.

BY

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THAT a very large percentage of our women suffer more or less permanent damage to the cervix or pelvic floor by parturition is well known to all physicians and it is tolerably common knowledge now among the laity.

The consequences of such injuries, in increased liability to epithelioma, cystocele, rectocele, uterine prolapse and procidentia, as well as the accompanying inconvenience, discomfort and often semi, or complete, invalidism of the unfortunate patients, are also well known to the profession.

These conditions force upon us the fact that every such case is, in reality, a surgical one and is liable to require immediate or remote surgical treatment to attain the highest degree of protection, conservation and usefulness. To attain these ends, many surgeons have undertaken at once to repair all recognizable damage after labor and, in the hands of a few men, this has been highly successful so far as the perineum is concerned, but not so with the cervix. I have known but one man who was willing to claim that he deliberately undertook to repair every cervical laceration immediately after parturition was completed. It must not be forgotten that in most cases of cervical laceration the lesion can scarcely, if at all, be detected immediately after delivery as this tissue is extremely soft and edematous, and lessens in bulk so rapidly during the first few days that any but an elastic suture must become loose within a few hours after being placed in position. Its presence, therefore, is useless. Again, it has been noted that almost all permanent cervical tears are lateral. In other words, the anterior and posterior lacerations practically heal spontaneously, and I firmly believe that the lateral tears would heal also if only we could keep our postobstetric cases in the horizontal position for ten days to two weeks. Sitting or standing positions cause the heavy uterus to descend into the pelvis, and as the principal supportive attachments of this organ are in front and rear, the vertical position causes the vesical connection to make traction upon the anterior lip of the cervix, while but a slight descent of the organ causes the rectal connections to pull upon the posterior lip.

Thus the anterior and posterior cervical lips are pulled in opposite directions and union is interfered with, or prevented entirely, in consequence of the common laws of gravity forcing down the heavy uterus.

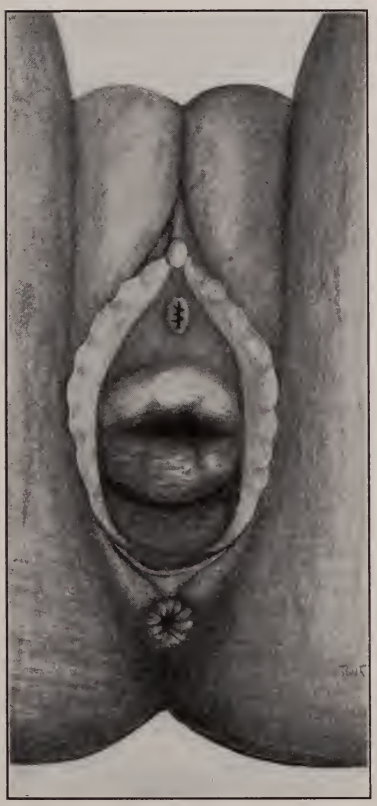


FIG. 1.

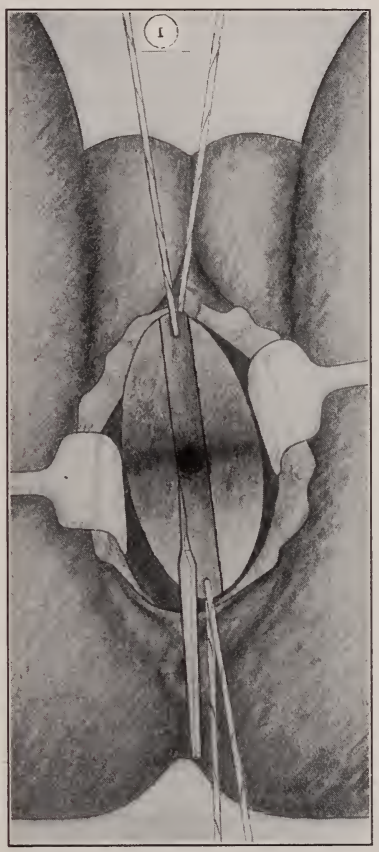


FIG. 2.

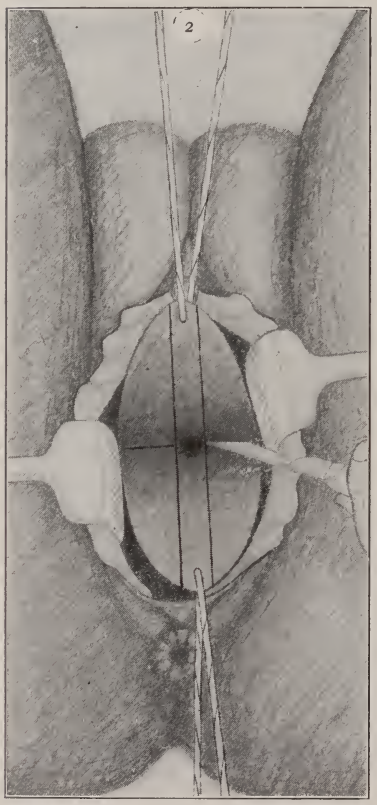
FIG. 1.—Is particularly to call attention to the old scars across the anterior and posterior lips which have united leaving the cervix almost perfect at those points while those placed latterly failed to unite because the vertical position assumed in sitting or standing pulled the anterior and posterior lips apart and prevented union.

FIG. 2.—Represents the traction sutures in place instead of forceps or tenacula as much less in the way and also shows the lines of incision through the mucosa at right angles to the surface for marking out the size of the mucous lining for the new cervical canal.

We cannot expect, therefore, that the general practitioner or surgeon will, or should, close these lacerations immediately; but in every case where a laceration of the cervix can be recognized, the

patient should be kept in the horizontal position for two weeks, and then if union does not occur, such repairs as are necessary should, if possible, be made before the patient is allowed to be up.

What we have said regarding the cervix is almost never true regarding the perineum. It is never difficult to recognize tears of the



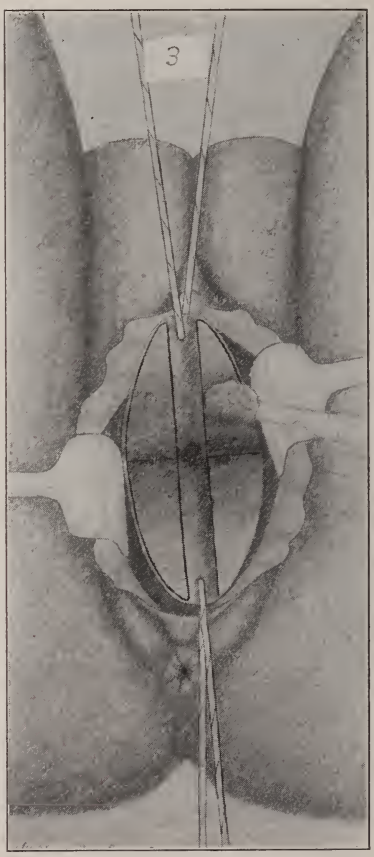


FIG. 3. FIG. 4.

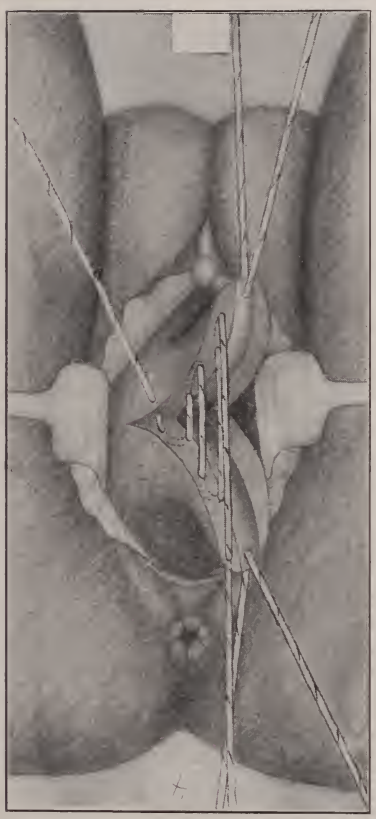
FIG. 3.—Shows cut being made at the bottom of the laceration through all the scar tissue and to mark the bottom of the angle of denudation to be made before suturing is begun.

FIG. 4.—Indicates the method of removing the area previously outlined for denudation prior to suturing. By this method it is very easy to reproduce a cervical canal which is perfect in its caliber and mucous lining.

perineum at once, and there is small excuse for a failure to secure good results after making an immediate repair of a perineal laceration, provided that due operative care is exercised in the approximation of the tissues, and that numerous punctures are made in the labia and

perineum to prevent the annoyance incident to postoperative edema.

The prevalent practice twenty-five years ago of amputating the cervix in cases of chronic subinvolution has, happily, been abandoned by all of our leading gynecologists, because it met no indication,



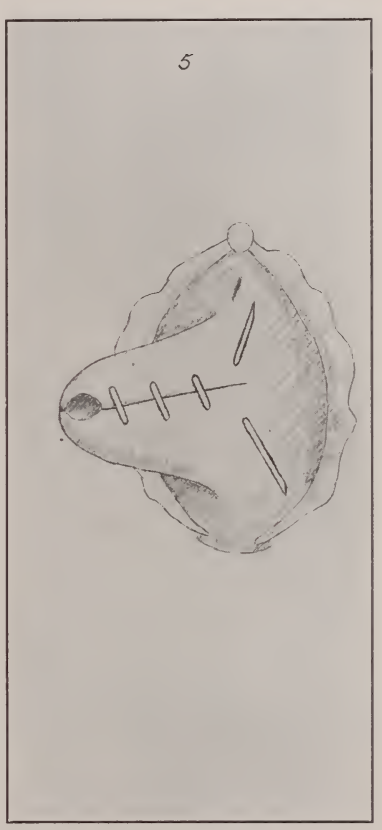


FIG. 5. FIG. 6.

FIG. 5.—Represents the method of inserting the inner row of continuous sutures to approximate the denuded area so that every part of the denuded area shall at all times be approximated to its appropriate raw surface.

FIG. 6.—Shows deep row of sutures drawn and superficial whipover completed and ready to tie.

except in the rare cases of hypertrophic cervical elongation; it rendered the women sterile in most cases and, if pregnancy subsequently did occur, the cervical orifice, now guarded by a complete circle of nonelastic cicatricial tissue was of a certainty again torn or cut in order to make delivery possible. Amputation of the cervix also

removes a part absolutely essential to the support of the uterus in its normal position. Cervical amputation is easy and the immediate effects are gratifying, but the end results have been so bad that I have not done the operation for twenty years.

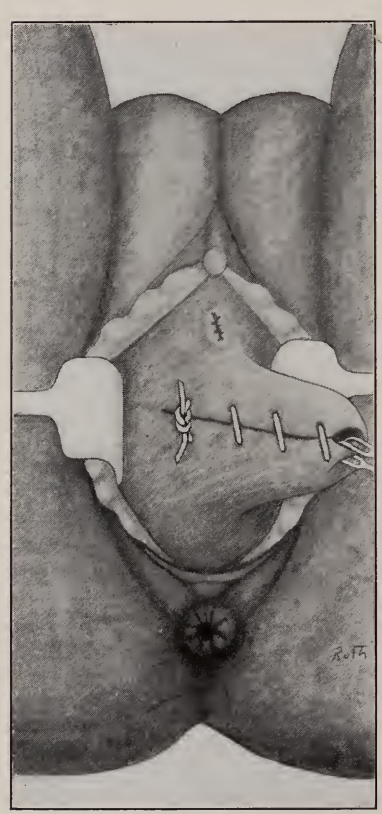


FIG. 7. FIG. 8.

FIG. 7.—Shows the suture completed, all slack taken up and a single knot securing all. No suture should be used for this purpose which will absorb in this tissue in less than ten days to two weeks. Chromic twenty- to thirty-day gut answers well.

FIG. 8.—Represents a relaxed vaginal outlet in which all perineal support is gone to the anus and the preliminary incision has been made at the muco-tegumentary margin from one hymenial remnant to the other.

In the repair of a laceration of the cervix it is imperative that all of the tissues involved shall be so perfectly approximated that the uterine neck shall, at corresponding points, represent the same thickness, and that the canal be restored to its original caliber. If the surgeon doubts his ability to do this by a through-and-through

interrupted suture, he should use a continuous suture placed in two layers.

In preparing the cervix for suture, if one is desirous of getting uniformly good results from any method of suture closing, the removal of scar tissue and the paring of the cervical margins must be done so as to give a uniformly adequate and calibrated cervical canal, and

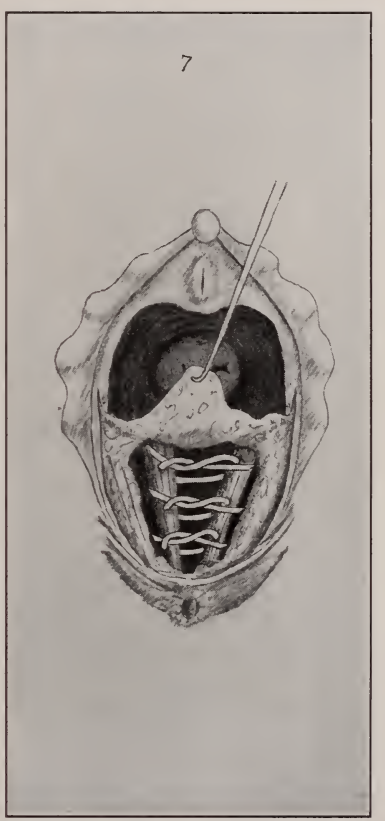


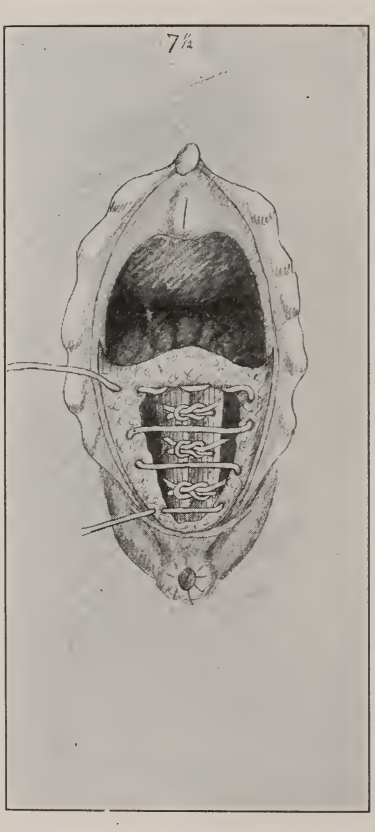
FIG. 9. FIG. 10.

FIG. 9.—Is to indicate the separation which is made with gauze between the vagina and rectum to expose the levator ani.

FIG. 10.—Shows the inner borders of the separated levators exposed and sutures in position.

thus enable the parts to coaptate easily throughout devoid of pronounced strain. I have found it possible to get the best results by first cutting through the angle of the tear directly upward until the resistance of the cicatricial tissue is past. When the cut is thus completed into the angle of the tear, the anterior and posterior cervi-

cal lips may be readily separated to the bottom of the incision. With the surfaces thus exposed, the boundaries of the new cervical canal are mapped out by making two incisions through the mucosa of each lip. These incisions extend in a parallel direction from the highest point of the separated lips and terminate at the cervical



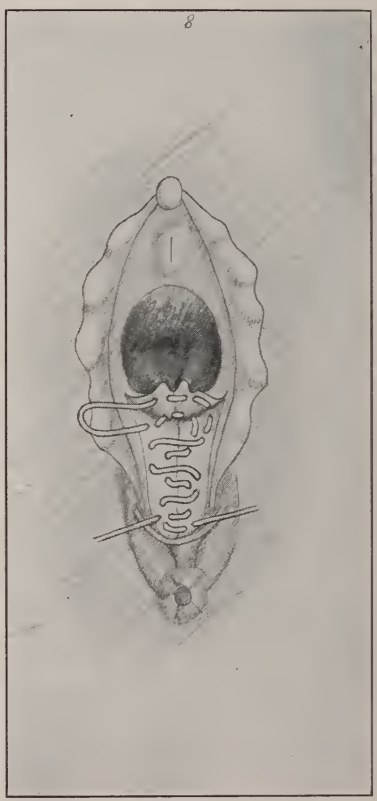


FIG. 11. FIG. 12.

FIG. 11.—Illustrates the method of placing the superficial sutures to approximate the tissues from within outward layer by layer with a continuous subcuticular suture catching up the highest point of separation of the vaginal flap so as to eliminate all dead space.

FIG. 12.—First superficial layer drawn and levators buried, superficial sutures placed in cobble-stitch fashion but not drawn.

tips, thus leaving a strip of unbroken mucosa anteriorly and posteriorly, with which to form the new canal. The remaining mucosa and any scar tissue are now removed, the paring being done in such a manner as to make the two sides of the cervix as nearly alike as possible.

Starting at the upper angle with thirty-day chromic gut, the suture is carried first from without inward to, but not through, the mucosa at the side of the new canal, then across into the inner one-half of the opposite lip and made to continue, approximating the inner one-half of the cervical denudation next to the new canal on one side. As the tip of the cervix is reached the last puncture from within out-

FIG. 13.—All sutures have been drawn and knot tied and cut short so it disappears in the wound. No suture is ever allowed to penetrate the skin.

ward passes through the entire thickness of the cervix; from the mucosa of the new canal outward the same thread is now passed in a whip-over manner, after all slack has been taken up of each loop uniting the inner part, and when thus placed the final puncture is made to emerge opposite the point of first entry of the needle. Adjustment of the tension of each loop makes a perfect approximation and but one knot is used. The opposite side is dealt with in

bilateral tears in the same manner. Since using this method my results in securing smooth, normal cervical repair have been improved 100 per cent., and it is, after three months, not easy to detect any departure from the virgin cervix in appearance or feel.

The repair of the perineum is quite a different proposition, immediate repair being indicated *except under very exceptional circumstances*, of which the attending physician must be the judge. Having decided to immediately close the perineum all needed provision must be made for careful asepsis, though the appliances be ever so few. Chromic gut will be very convenient, if at hand; if not, freshly boiled silk will be the next best material. Repair should first contemplate the closure of the rent carefully on the vaginal side, then if the laceration is simple the deep sutures should be placed so as to carefully approximate the separated levator ani muscles, or, at best, the operation will be a tegumentary cosmetic success of no practical value.

The sutures used to effect approximation of the perineum, whether they be silk or catgut (silkworm-gut should never be used), should not be allowed to pass through the skin. The vaginal mucosa must, of course, be penetrated in making the closure of all vaginal tears; but when the vaginal mucosa is passed in closing the perineum, no sutures should be allowed to penetrate the skin, for they will cause great and unnecessary pain, will always cut, and in many cases lead to infection. Failure to observe this rule and to prevent edema of the parts by numerous punctures has caused a great amount of needless suffering, besides favoring infection and interfering with union. Should the laceration be complete, the most scrupulous care must be exercised or failure will be almost certain. The rectum must be carefully packed with strips of gauze to make contamination of the field by alvine discharge impossible. Then all tags and uneven margins must be removed from both the rectal and vaginal margins, so that firm even approximation can be made which will represent tissue with good vitality, and the suturing must be close enough to insure a water-tight joint.

The rectal and vaginal sides must be closed separately, carefully, and completely from above downward, and the sutures of catgut on the rectal side tied in the rectum. The vaginal wall sutures may be of silk if desired. The levator ani muscle and all deep perineal structures must be united from within outward, layer by layer, with chromic gut for the levator ani and deep perineum but plain gut for the superficial parts. If the sutures are properly placed, three or four loops of chromic gut should suffice to unite the levator ani. As

many stitches as are needed should be taken to complete the approximation of the tissues external to the levator. Not more than two knots will be required to properly close the superficial tissue of any perineum. The superficial perineal suture of plain catgut is placed in the cobble-stitch manner. When the work is done no knot or suture should appear at any point except in the cases of immediate repair in which silk has been used, then each stitch should protrude at the suture line.

In complete lacerations the procedure, after closing the rectal and vaginal sides, is exactly as though the vaginal and rectal membranes had been left intact, and only the levator ani and skin of the perineum had given way, except that the sphincter ani must be carefully united. In closing a recent laceration *with silk*, the sutures are better placed on the figure-of-eight plan and none tied until all are in position. All must be removed and the layer buried suture plan cannot be used with nonabsorbable material.

In complete tears of the perineum the *sphincter ani* must be secured with the greatest care. To do this sometimes requires extension of the incision or opening laterally around the anus until the ends of the muscle are exposed. After the work of repair is completed the gauze packing must be carefully removed from the rectum and a large drainage tube introduced through which any gas, as well as fecal material, may readily escape. (This applies only to complete lacerations.) The alvine evacuations must be kept free and semifluid, to prevent the possibility of the formation of scybalous masses and the strain attending their expulsion. The tube must be secured in place by sutures.

In old perineal lacerations, perineorrhaphy should be done whenever the perineum resembles the web between the thumb and forefinger, viz., two layers of skin without any muscular tissue between, and that without reference to whether the mucous membrane or skin has been torn. In many cases the levator ani muscles have been entirely separated and all the support, given by the true perineal floor, is gone; the skin portion remains intact, but fails to give adequate support. In the secondary operations for perineal repair the preliminary steps are different, but the suturing details are the same, in many respects, as those employed in recent cases. Preparation is made by thorough emptying of the alimentary canal and flushings completed several hours before the time of operation. Frequent bichloride douches also are given. No solid food is allowed for twenty-four hours preceding the operation. When all is ready the vulva, having been shaved some hours pre-

viously, is painted with tincture of iodine, the vagina is treated in the same manner, after all possible moisture has been removed from it with gauze mops.

The anterior limits of the new perineum are indicated by beetle or light mouse-tooth forceps fixed upon the line of the hymenial remnants on either side, while with the knife or scissors an elliptical incision is made around the crescent of the posterior vestibule, from one forcep to the other, in the junction of the hymen remnants or vaginal mucosa on one side and with the integument on the other. Then with forceps having a broad bite the vaginal side of the separation is grasped posteriorly, and with dry gauze over the index finger the vaginal and rectal walls are separated rapidly until the levators ani are well exposed on either side and of sufficient extent to give all needed support. The guide forceps are now removed and placed upon the middle of the exposed levator ani muscles on either side; they are temporarily used to aid in the approximation of the separated perineal floor during the suturing. Separation of the vaginal and rectal walls should extend but slightly above the level of the levator ani muscles because the support can never be extended above this point; if the separation extends much above their level, it means that a space is formed in which blood and serum will accumulate, which invites infection, causes pain and, at times, abscess formation.

In approximating the levator it is wise to have all the space taken up by catching the highest point of separation between the rectum and vagina with the needle by placing one or more sutures so as to insure obliteration of all dead space. After the approximation of the levator ani muscles, with chromic gut the vaginal outlet is sufficiently narrowed—this is determined by digital examination; the superficial perineum is closed, layer by layer, by a continuous cobble-stitch suture of plain catgut, from within outward, and always from side to side. No needle puncture should be allowed to penetrate the skin.

A perineum thus closed should, when completed, be united vertically, should show no raw surfaces, no suture except possibly the end of the thread from the last knot (usually not even that will show), and no one should, except on very close inspection, be able to determine that a perineal laceration ever existed. *Many punctures of the labia and perineum should be made with a cutting needle so that all swelling shall be prevented by ready escape of serum.* Care should be used not to cut the catgut sutures with the needle with which the skin is punctured.

The majority of patients will be able to urinate from the start and thus another danger is averted, viz., cystitis from catheterization, which, in times gone by, has left so sad a trail after many of these operations. Trading a cervical and perineal laceration for a cystits is often a very poor bargain. In the majority of cases, when the work is properly done, the patient complains of no pain, infection never follows and, within three weeks, it is practically impossible to tell that a laceration ever existed or that an operation was ever done.

Usually we introduce a suppository, containing 1 grain of opium, into the rectum and apply sterile (white) vaseline to the perineum. Vaginal normal saline douches may be begun on the third day, given twice daily, using a soft rubber catheter as a tip for the douche point. The douche should always be given under low pressure.

Formerly, as a preliminary step, we curetted the uterus in all cases, but this practice we have long since abandoned as serving no useful purpose, because it possesses an element of danger even in the hands of the most skilful surgeon. In some cases, however, we consider it good practice to first gently dilate the cervix, remove all possible secretion, and apply tincture of iodine to the entire interior of the uterus.

SPLENIC ANEMIA WITH SPLENECTOMY.

BY

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THE term splenic anemia was first used by Gretsel in 1886.(1) The first systematic description of the disease was published by Banti in 1883.(2) In 1894 Banti(3) described, in French and German journals, the form of the disease characterized by splenomegaly with cirrhosis of the liver to which subsequent writers have attached his name. Since the appearance of Banti's description much has been written and many cases reported, yet we are still uncertain as to the cause of the disease, as well as of the proper classification of the different types.

At present most writers divide the disease, clinically, into three groups, viz.: Banti's disease; splenic anemia, as described by Osler,(4) and the Gaucher type.(5) The latter type is well described by Erdmann and Moorhead(6) and by Brill and Mandelbaum.(7)

The idea advanced by Osler is now generally accepted, that "the conditions separately described in the literature as primary splenomegaly, splenic anemia, splenomegalic cirrhosis of the liver, or Banti's disease are stages of one and the same malady." Lyon(8) says: "primary splenomegaly and splenomegaly with cirrhosis of the liver (Banti's disease) are regarded as initial and terminal stages, respectively, of splenic anemia."

According to Herrick(9) the Gaucher type comprises a small number of cases with hereditary tendency, in which endotheliomatous growths occur in the spleen and metastasize to the splenic and portal veins and to the liver. Erdmann and Moorhead(10) reported two cases and collected from the literature fourteen others of the Gaucher type.

The cause of the disease is unknown. Bacteriological examinations of the organs and animal inoculation have all proved negative. The fact that the enlargement of the spleen precedes the anemia is an argument in favor of the primary disease being within the spleen. Another point in favor of such a theory is the great improvement and, in many cases, cure after splenectomy. Dock and Worthin(11) suggest that the anemia may be caused by excess of hemolysis occur-

ring in the newly formed hemolymph glands over that of the normal spleen, or to a disturbance in the elaboration of the products of blood destruction. It seems probable from a study of the diseased organs and the clinical symptoms of the patient that the fibrosis of the spleen, the anemia and the final cirrhosis of the liver may be due to a common cause, namely, an intoxication of an unknown origin. Wilson says:(12) "While these eighteen cases presented clinical symptoms of such uniformity as to compel the clinician to group them together, the variation in their morbid anatomy is so great that, for purposes of pathological description, it becomes necessary to divide them into classes as follows: Class A, chronic lymphocytic hyperplasia; class B, primary proliferation of the endothelium of the spleen (Gaucher type); class C, primary (chronic) diffuse hyperplasia of the spleen (chronic splenitis). In the chronic lymphocytic hyperplasia, Wilson found the histological picture almost identical with that of lymphosarcoma; but, inasmuch as the two cases he reported are alive five and one-half and seven years after the operation, he thinks it highly improbable that any neoplastic growth existed outside the spleen in either case at the time of the operation. He further says: "I am inclined to believe that, while in their final histological aspect they may become true neoplasms (lymphosarcomata), both developmentally and clinically, their early stages represent only an extensive lymphocytic hyperplasia, with only a slight return of the cells to their primitive mesoblastic type." In Class B, Goucher's type, the most striking feature is the enormous proliferation of the endothelium of the veins or sinuses.

A tabulation of the recorded cases in the literature has been made by Reuben,(13) and Mandelbaum's(14) and Wilson's(15) recent articles contain a valuable pathological digest of the cases regarded by them as authentic. Erdmann and Moorhead(16) add two cases with careful description of them. Class C, primary diffuse hyperplasia of the spleen, seems to be the most common variety. Wilson reports thirteen cases.

Treatment.—All known forms of therapy have hitherto failed. Splenectomy or ligation of the blood supply of the spleen give the best results. The latter should be used only where the removal is difficult or hazardous owing to adhesions. A short time ago, half of the cases of splenectomy died. The chief reason for this ill success was, probably, due to the fact that surgeons did not know what cases of splenic disease were suitable for a splenectomy, and in what cases the operation was contraindicated. This question is not yet fully determined, but we know now that many cases of splenic disease

are unsuitable for splenectomy. In enlargements caused by leukemia it is the hemorrhagic diathesis accompanying it which forbids splenectomy. Besides, leukemia takes its origin rarely in the spleen, according to some writers never, and therefore a splenectomy would be useless. It is on account of this selective policy that statistics have improved.

J. Vauverts(17) collected twenty-nine cases of splenectomy for leukemia with twenty-six deaths and three cures. Mortality 89.6 per cent. One of the cured cases was not a true leukemia, and in the other two cases the disease returned. Mayo says:(18) "The leukemic spleen has been removed a number of times and in practically all of the cases in which the diagnosis was established, the patient died promptly as the result of the operation." Vauverts collected, in 1879, seventy-nine cases of splenectomy for malarial splenomegaly. Results: fifty-six cures, twenty-three deaths, mortality 29.1. Bessel Hagen(19) published statistics of 114 cases with eighty-three cures and thirty-one deaths.(277)

In 1901 Jonnesco(20) reported twenty-eight cases with twenty cures and eight deaths. Mayo reports(21) twenty-seven cases with two operative deaths. Johnson(22) found a mortality of 27.4 per cent. in 708 cases. Bragagnolo collected, in 1899, 119 cases with the following results: Until 1880, 100 per cent. mortality; from 1881–85, 80 per cent. mortality; from 1886–90, 31 per cent. mortality; from 1891–95, 17 per cent. mortality; from 1896–98, 19 per cent. mortality. Mayo says: "The operation itself, if the patient be in fair condition, should not have a mortality of above 10 per cent. and probably not above 5 per cent. In our twenty-seven cases there were two operative deaths."

Ligation of the blood-vessels for various forms of splenomegaly has been practised but, according to Steele(22) (discussion of Harris and Herzog's paper), the mortality must be high, inasmuch as of six cases thus operated upon four died.

Case Report.—The patient is an American; farmer's daughter; unmarried; aet. twenty-five; father and mother both living and in good health at forty-eight and fifty years, respectively. One sister, two years her senior, died at the age of four with some severe bowel trouble. The patient was ill in a similar way at the same time. The mother dates the beginning of her present trouble from this illness. There was no record of tumor or recurrent disease in the family history. She has spent all her life on the farm, doing housework. Menses first occurred at fourteen years. They were always regular and normal. As a child she had the severe bowel disorder, as mentioned above, at about her second year. This ill-

ness lasted about six weeks. She had bloody stools and convulsions. One year later was again ill with what the doctor said was typhoid fever. She was confined to the bed and house for about three months. One of the most pronounced symptoms of the illness was a disturbed stomach. She vomited a great deal. Vomitus at times contained blood. Her mother noticed the enlargement in her abdomen in her eighth year. The normal curve at the waist line was lost and she walked with her body inclined to the left side. The skin became harsh and mottled a year or two afterward. She was never well and did not develop as she should. She improved until her twenty-first year. She began to do her part of the housework. At about this time her weight was 139 pounds.

Present Illness.—Two years before her admission to the hospital she became weak and languid, lost her appetite and vomited. She says she had vomited almost every day since she was eight years old, but that at the beginning of her present illness she vomited much more frequently. She was compelled to give up her work. Complained of pain over the tumor. There was marked shortness of breath. The weakness became so great that she was compelled to take her bed about six months before she came to the hospital.

Examination showed a fairly well-nourished woman of medium build; weight, 125 pounds. The skin showed a swarthy or brownish tinge, unevenly distributed over her body. There were a number of pustules about the nose and mouth. Flesh was soft and flabby. Appetite poor. Constipated. She was unable to lie flat upon her back; had to be supported by a number of pillows. Complained of shortness of breath and a sense of fullness and weight in the abdomen. Upon attempting to walk she had a dragging pain in the upper left abdomen. She was almost constantly eructating gas and, occasionally, would vomit. I saw no blood in the vomitus. She gave the history, however, of it being present frequently, though never in large quantities. She complained of frequent urination. She was compelled to get up many times during the night. The urine was always normal in appearance. The heart and lungs were negative. Temperature 98.8, pulse 85, respiration 20. Abdomen enlarged with the greatest fullness to the left of the median line. Skin dry, harsh and pigmented brown. Liver two finger-breadths below the free margin of the ribs and extended upward to the 10th interspace. The surface of the liver was smooth. The spleen filled the entire left abdomen. It extended from the free margin of the ribs into the pelvis and projected beyond the median line to the right side. No free fluid could be demonstrated. The spleen seemed smooth and was only slightly tender on palpation. Pelvis normal.

Blood count before operation, March 17, 1912: Red blood cells, 3,150,000; white blood cells 2500; hemoglobin, 65 per cent. Differential count: Large mononuclears, 9 per cent.; small mononuclears, 23 per cent., polymorphonuclears, 64 per cent. The red cells showed no marked variation in size. There were no nucleated reds. Poikilocytosis moderate. Wassermann reaction negative.

Diagnosis.—Primary splenic anemia.

Operation.—Splenectomy, March 20, 1912, was done by the writer assisted by Dr. John H. Eberwein. Ether anesthesia. The abdomen was entered by a long incision at the outer border of the left rectus muscle. The spleen was found free from adhesions. The vessels were secured by rubber-covered clamps; each vessel was tied with two silk ligatures and the spleen removed. 1000 c.c. of normal salt solution was given intravenously at the time of the operation. The time consumed by the operation was thirty-five mintues. No blood was lost during the operation except that within the spleen itself. The writer was astounded by the great quantity of blood that flowed from the spleen when the clamps were removed. Enough blood was lost in this manner to blanch the skin.

Exploration of the abdomen showed the liver enlarged, but otherwise normal in appearance. Gall-bladder was normal and could be emptied. Appendix normal. Kidneys normal in size and position. Stomach enlarged and ptosed. No free fluid in the abdomen. The blood picture improved, at once, after the operation; showing almost an immediate increase in the red cells, also in the white cells.

Dr. John H. Eberwein visited the patient October, 16, 1914, more than two years and a half after the operation, and found the patient greatly improved. She was doing her share of the housework. She had not vomited since leaving the hospital, but complained of "sour stomach." She had not gained in weight; in fact, she was 2 pounds lighter, but her muscles were firm and her color good. The abdominal wall was lax and when standing the lower half protruded more than it should. The stomach remained large and was dropped below the umbilicus. The liver dulness was normal; the liver itself could not be palpated. Her appetite was good. Blood examination: Red cells, 4,000,000; white cells, 9400; hemoglobin, 70 per cent. Differential count shows large mononuclears, 6 per cent., small mononuclears, 47 per cent., polymorphonuclears eosinophiles, 3. Urine normal. The frequent micturition was relieved.

Pathological report by Dr. Henry R. Alburger, formerly Professor of Pathology of the Indiana University School of Medicine: Weight of spleen, 5000 grams. The exterior was roughened and had a mottled, greenish-gray color. The surface had the appearance of being covered by an organized inflammatory exudate. It was impossible to scrape it away, however, without tearing into the capsule. The capsule was slightly thickened and the trabeculæ were correspondingly conspicuous, although in neither case was there the amount of fibrosis that one would expect from the size and firmness of the organ as a whole. The splenic pulp was very much changed from the normal on account of the large diffuse increase of the connective tissue. The increase was in the form of thickening of the walls of the venous sinuses so that they were exceedingly prominent. The connective tissue was in the form of a young type of cell, with a considerable amount of fibrous intercellular substance, much of which was hyaline. The lymphocytes in the pulp were compara-

tively scarce. The Malpighian bodies were normal, but widely separated by the increase in the pulp areas. The arterioles were unchanged.

My interpretation of this picture is that there had been for a long period of time a low grade of inflammation, probably dating back to the attack of typhoid mentioned in the history, and that the process is a continuous and progressive chronic interstitial splenitis.

Summary.—The histopathological picture presented in this case is that of primary diffuse hyperplasia of the spleen (chronic splenitis). While the writer only claims great improvement, the patient in a recent letter considers herself cured.

In conclusion I wish to thank Dr. Eberwein for the examination of the blood. I am also under obligation to Dr. Alburger for the pathological study of the case.

BIBLIOGRAPHY.

1. Gretsel in 1866. *Berl. Klin. Woch.*, 1866.
2. Banti in 1883. *Arch. d. Scuola. patol.*, Firenze, 1883, xi, 53.
3. Banti in 1894. *Semaine med.*, Paris, 1894, xiv, 318.
4. Osler. *American Journal of Medical Sciences*, cxix, 900, p. 54.
5. Gaucher type. *Thése de Paris*, 1882; *La Semaine Medical*, 1892, xii.
6. Erdmann and Moorhead. *The American Journal of the Medical Sciences*, vol. cxlvii, No. 2, 1914, p. 213.
7. Brill and Mandelbaum. *American Journal of the Medical Sciences*, cxlvi, p. 63.
8. Lyon. Osler's Modern Med., vol. iv, Part III, p. 759.
9. Herrick. *Annals of Surg.*, vol. lix, No. 5, p. 690.
10. Erdmann and Moorhead. *American Journal of the Medical Sciences*, Feb., 1914.
11. Dock and Worthin. *American Journal of the Medical Sciences*, Jan., 1904.
12. Wilson. *Surg., Gynec. and Obst.*, March, 1913.
13. Reuben. *American Jour. Dis. Children*, Jan., 1912.
14. Mandelbaum. *Jour. Exp. Med.*, 1912, xvi.
15. Wilson. *Surg., Gynec. and Obst.*, March, 1913.
16. Erdmann and Moorhead. *American Journal of the Medical Sciences*, Feb., 1914.
17. Vauvert, J. *Jour. Médical Francais*, Paris, 1911, v, 538–541.
18. Mayo. *Surg., Gynec. and Obst., March*, 1913.
19. Bessel Hagen. *Archiv of Klin. Chir.*, 1900, Band lxii, No. 1.
20. Jonnesco, 1901. *Bull. et. mên Soc. de chir. de Bucharest*, iv, No. 2, 64.
21. Mayo. *Surg., Gynec. and Obst.*, March, 1913.
22. Johnson. *American Surg.*, Phila., vol. xlviii, 1908, 50–65.
23. Steele. *Am. Surg.*, July, 1901, xxxiv.

MORPHOGRAPHY OF TWO HUNDRED AND EIGHTY-FIVE COLONS.

BY

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(With illustrations.)

This study was made for the purpose of determining the relative positions of the colonic segments, the nature of the usual angulations, the frequency of undeveloped parts, and the extent of deviated morphology consistent with adequate physiological function. The material used consisted in bodies embalmed with formol, phenol and glycerine compound in preparation for dissecting purposes. The records were made after widely uncovering the anterior abdominal wall and placing a glass plate immediately over the colon and then carefully tracing the outlines in ink which were afterward made permanent upon paper. It was not possible to secure antemortem data of very much value. However, the following may prove somewhat interesting and may, in at least an unknown number of instances, bear upon the etiologic relation of colonic pathology and psychopathology. The average age at death of all the bodies was 54.8 years. Eighty-seven per cent. were males. Four per cent. were of the colored race. Fifty per cent. of the 285 had been patients of asylums. Forty-four per cent. were from jails, reformatories and county houses. Unknowns represented 6 per cent. of the total.

The clinical diagnoses of causes of death were assigned as follows: Diseases of the heart 8 per cent.; of the kidney 4 per cent.; of the brain 20 per cent.; from tuberculosis 14 per cent.; arteriosclerosis 7 per cent.; senility and general debility 5 per cent.; pneumonia 5 per cent.; malignancy 2 per cent.; diabetes 2 per cent.; accidental causes 8 per cent.; asthma 3 per cent.; pernicious anemia 4 per cent.; multiple abscesses 4 per cent.; unknown 6 per cent. (percentages approximated). The foregoing has but little value for, manifestly, no scientific verification of the assigned causes of death were obtained. The interpretation of the morphography and gross pathology of this material merits some qualification because of possible variations from gas, rigor mortis, agonal and embalming effects; yet

the purposes of this paper are attained without any important modification from this source.

In this series of 285 there were approximately 32.5 per cent. of the

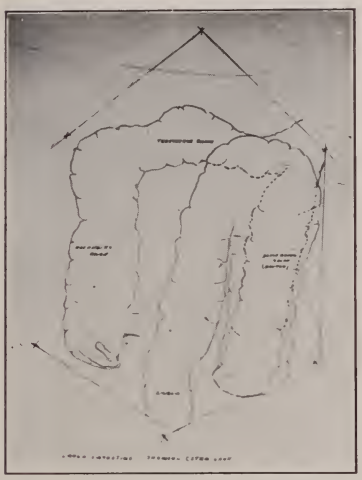

FIG. 1.—Very long colon with full length return loop on left side.

FIG. 2.—Long colon. Entwining of transverse and descending segments.

colons with normal morphography. In 9.9 per cent. of all cases there were persisting embryologic forms. In 0.9 per cent. there was

FIG. 3.—Incomplete rotation.

incomplete rotation of the colon, and in 1.4 per cent. there was incomplete descent of the cecum. The transverse segment of the colon had descended to some point between the umbilicus and the

pubes in 15.5 per cent. of all cases. In 17.8 per cent. of the subjects there were abnormalities of the pelvic colons.

There were diverticulæ in 0.9 per cent., gigantism in 0.9 per cent.

FIG. 4.—Sigmoid colon high and well to the left.

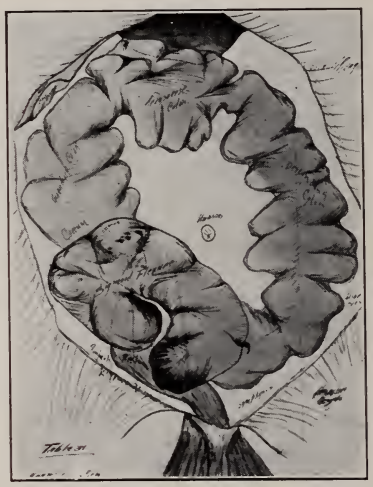

FIG. 5.—Sigmoid colon well to right side.

and marked constrictions in 2.3 per cent. of the colons. Adhesions were observed at the hepatic flexure in 5.8 per cent., at the gastric

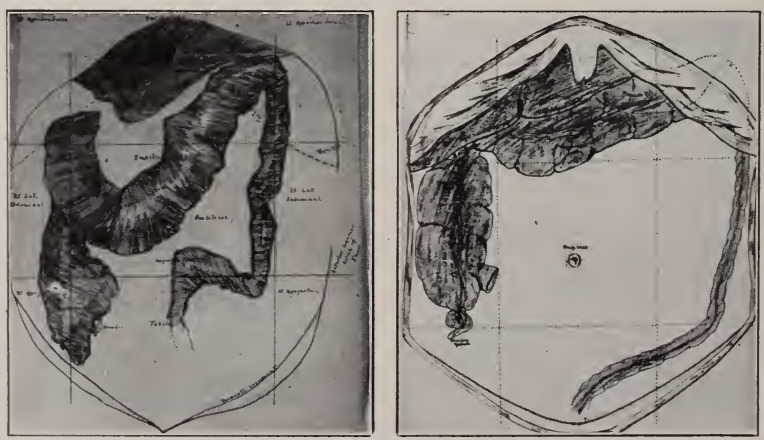

FIG. 6.—Stasis to the splenic flexure.

area in 4.2 per cent., and at the ileocecal region in 7.5 per cent. of the subjects. There were distinct enlargements of the colons proximal to constricted splenic flexures with evident reasons for delayed

motility, in 8.4 per cent. of the series. In 4.3 per cent. of the pelvic colons there was no angulation, only a slight curving being evident from the midportion of the descending segment to the rectal tube.

FIG. 7.—Incomplete descent of the cecum.

There were convincing evidences of etiologic conditions for constipation in 55 per cent. of the subjects. Two cases (or 0.6 per cent.)

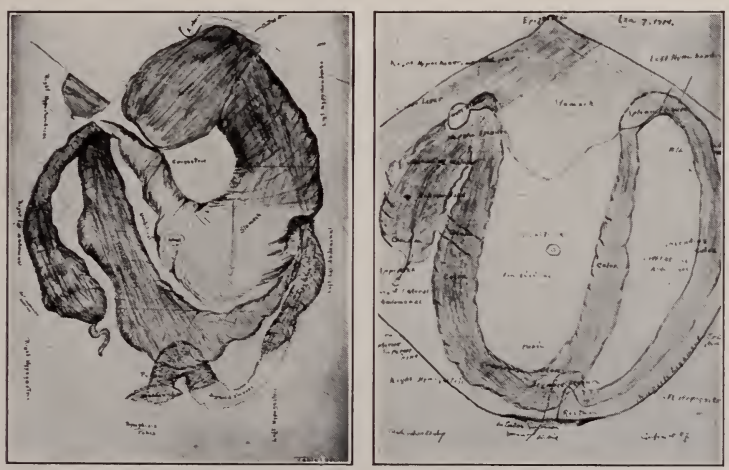

FIG. 8.—Ptosis of the colon.

of herniated ceci were found. In 1.2 per cent. of the ceci they were fishtail in shape and in 20.7 per cent. decidedly pouched in form. The ascending colon was found in oblique positions in 13.7 per cent.,

and in horizontal positions in 0.6 per cent. of the subjects. The average length of this segment was one-sixth of the entire colon, approximately 10 inches. The hepatic flexure appeared in distinct

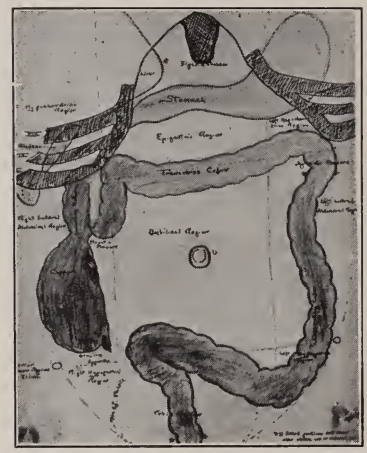

FIG. 9.—Sacculated cecum.

FIG. 10.—High position of sigmoid.

coil forms in 0.9 per cent., and in very acute angulation in 21 per cent., and was absent or presented only a slight convexity toward the liver in 7.8 per cent. of the subjects. The transverse colon was

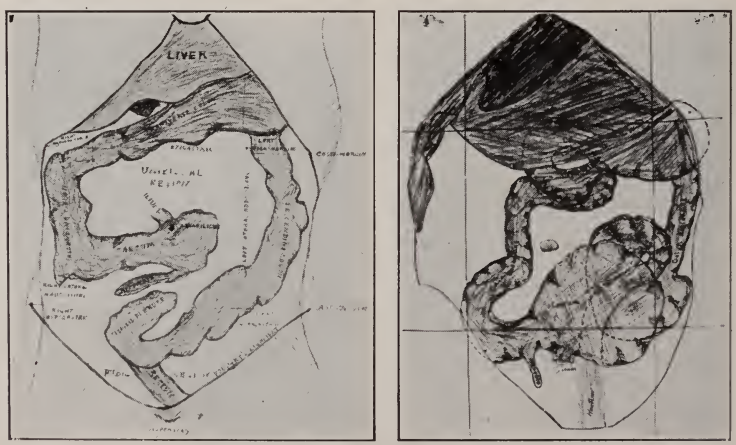

FIG. 11.—Incomplete rotation.

found low in the pelvis in 4.9 per cent. of our material, and a marked ptosis in 23.4 per cent. The splenic flexure was absent in 4.2 per cent., coiled in 1.2 per cent., and of a clothes-pin form in 2.1 per cent.

The descending colon was found to be coiled, between the splenic flexure and the pelvic brim, in 4.2 per cent. of the series. The pelvic colon was almost straight in 16.8 per cent. of the cases, was

FIG. 12.—Stasis to the splenic flexure and also in sigmoid flexure.

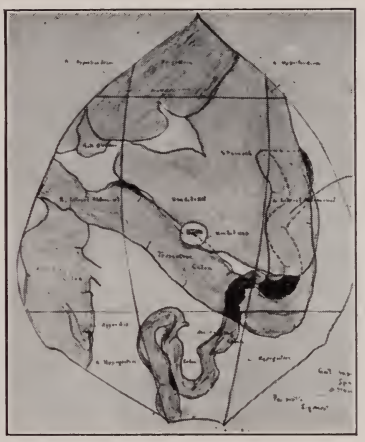

FIG. 13.—Stasis to the splenic flexure and ptosis of transverse segment.

acutely angulated in 16 per cent., coiled and agglutinated in 3.1 per cent. and appeared well over on the right side in 2.4 per cent.

FIG. 14.—Short ascending segment.

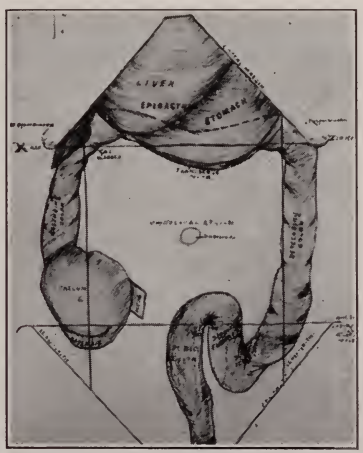

FIG. 15.—Sacculated cecum.

The foregoing data tends to the conviction that colonic anatomy does not conform at all strictly to a definite morphography or, at least, the exceptions are so numerous as to warrant alertness in

anticipation of the numerous possibilities in exploration of the abdominal cavity. The more important factors determining colonic morphology are: Length of the colon; displacement from the small

FIG. 16.—Long colon. Sigmoid enlarged on right side.

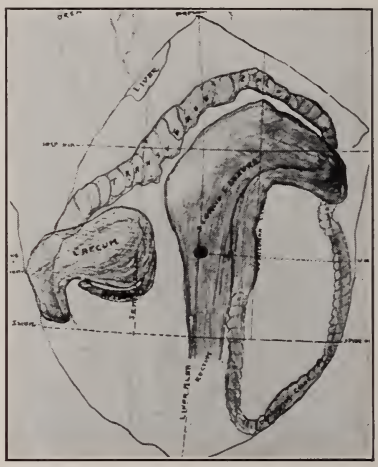

FIG. 17.—Tumor of sigmoid colon. Extreme high position.

intestine, the abdominal wall and its musculature; peritoneal attachment, displacement from other viscera, like the stomach, liver, kidney, gall-bladder, spleen, and uterus; retarded development, and

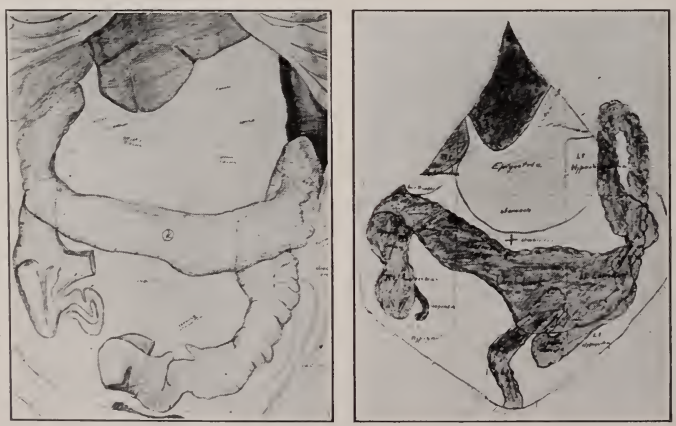

FIG. 18.—Ptosis of the colon.

the pathological changes following angulations, inflammations, atony, fecal impaction, hypomotility, tumors and hernias.

The average length of the colon is, according to Cunningham,(1)

5 to 5½ feet, or one-fifth of the entire intestinal canal. Davis(2) says the large intestine of the male is 4 feet 6 inches long, and that of

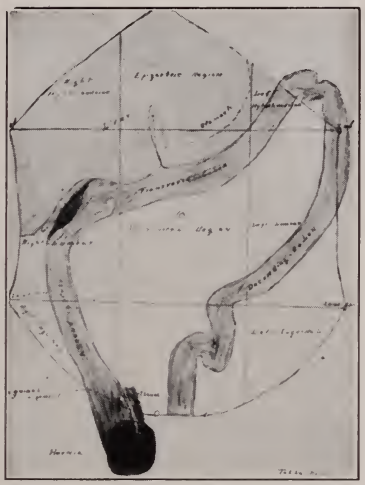

FIG. 19.—Hernia of the cecum.

FIG. 20.—Enormous dilatation and low mid position of cecum.

the female is 4 feet 8 inches in length. It is to be expected that the length of the colon will directly vary its capacity. However, as great

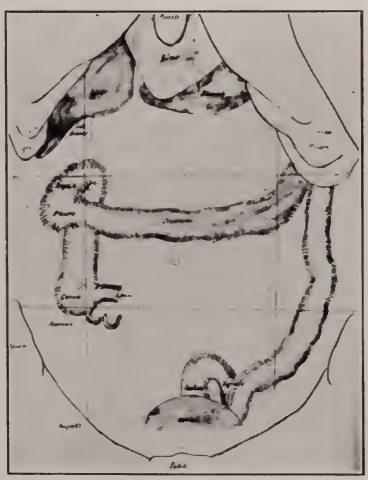

FIG. 21.—Normal length colon. Low transverse segment.

FIG. 22.—Short colon.

length of the colon predisposes to local angulations, and to sacculating in dependent portions, it necessarily predisposes to an increased

capacity; and the normal adult capacity of 10 pints may be increased several pints, the resulting increased weight and delayed motility tend to change the normal positions. A long colon with its cecum low down in the pelvis and at right angles with the greater part of the ascending colon, is not only closely contiguous to frequent pelvic pathology, but is seriously handicapped dynamically. It is not only the largest calibered segment of the colon, but its contents require vertical propulsion during many hours of the day. The frequent adhesions following inflammations of the appendix serve to contribute to the dynamic difficulties of the long colon in this position. The long colon is frequently festooned from the hepatic and splenic flexures low down in the pelvis, and from the splenic flexure to the pelvis there may be coils or a return loop may have formed. In the pelvis a complete figure of eight may form and occupy both the right and left sides of the pelvis; the cecum and appendix are, occasionally, herniated through the inguinal ring.

In early life displacement of the colon by the small intestine to its normal positions is not always successfully accomplished. The large number of twenty-eight in a series of 285, or approximately 10 per cent., is evidence of this fact. The description of the development of the human intestine and its position in the adult by Mall(3) throws considerable light upon this subject. "The various loops of the adult human intestine as well as their positions are already marked in embryos of five weeks. The small intestine increases its length five times, while the large intestine is increasing over two times and, as the space they should occupy in the body remains the same, escape must be made into the colonic cavity within the umbilical cord. After further rapid growth, the organs have been pressed down to the pelvis as far as they will go. In so doing the large intestine makes a sharp bend in the neighborhood of the fourth lumbar segment, making a fixed point toward which the viscera descend but beyond which they do not go. The large intestine lies in the sagittal plane of the body partly within the body and partly within the cord. It does not grow as fast as the small, which is folded into coils and held by its mesenteric attachment. Both small and large intestine now rotate about a common axis, the small intestine being gradually turned from the right to the left side of the body under the superior mesenteric artery. This takes place while the large intestine has an anteroposterior direction and before there is any transverse colon." It will be recalled by those who have studied the intestines of infants how evident is the domination of the large intestine by the coils of the small intestine and the liver. The

embryo is 40 mm. long when the intestines are returned to the abdominal cavity, and the cecum is thrown to the right under the liver where it remains until the fourth month after birth.

The influence of the abdominal wall upon intestinal positions is strikingly illustrated in congenital umbilical hernias and in the very common relations of thin relaxed abdominal walls to general ptosis. In many of the subjects in this study there were found numerous instances of ptosis probably caused by thin abdominal walls and long mesenteric attachments. There was no doubt whatever of deviated morphography, but absence of acute flexures and kinks and the appearance of normal bowel in all the segments tend strongly to prove that ptosis alone does not, necessarily, prevent normal function. It is doubtless true that these are cases of congenitally long mesenteries and supports, and as Streeter(4) says "white fibrous tissue, which is the real supporting connection, does not stretch," we are disposed to regard these as congenital ptoses. In this type of cases the thin abdominal wall disposes readily to the distress and bearing-down sensation complained of after considerable exercise in the upright position. These cases are almost instantly relieved by taking the prone position. The increase of the abdominal musculature and abdominal fat produce pressure upon the viscera that is frequently sufficient to secure replacing of deviated colonic segments.

Displacement of the colon by other viscera occurred in twenty-three cases from the stomach and duodenum; twenty times from the gall-bladder; six times from the liver; and five times from the pelvic viscera in 285 subjects. The percentage of males being 87 per cent. serves to lower the number of displacements from pelvic viscera. If the total of stomach, gall-bladder and liver displacements is taken, it will be found to equal, approximately, 18 per cent. This is of much significance since the absorptive function of the colon is limited to the segments between the cecum and the splenic flexure, and also because "fermentation and accumulation of gas is greatest in the cecum and ascending colon" (Cohnheim)(5).

It is also very important to have in mind that the probable etiologic bearing displacements in the upper abdomen may have upon appendiceal pathology. The view that appendicitis finds its most frequent etiology in direct and remote effects of kinks, bands and twists in the gut tube is worthy of primary consideration. The lymph vessels are more numerous in the cecum than in any other part of the large intestine. Efferent vessels pass partly to the celiac and partly to the lumbar glands, those of the appendix enter the

ileocecal and ileocolic glands. The lymph vessels of the cecum, ascending colon, and appendix are connected with the superficial lymphatics of the right kidney (Schafer)(6).

It is therefore significant that extensive pathology can result from kinks, twists, constrictions obstructing this part of the colon. I have referred to the frequency of retarded development. In this series it is found more frequently than displacements from any one viscus. It is altogether probable that in the adult retarded development is found more frequently in the colon than in any other part of the body. The normal position of the colon being as it were at the periphery of the abdominal cavity enforces exposure to the pathology of the entire abdominal viscera, and because it is a hollow viscus depending upon the patency of its lumen for normal function, its liability to mechanical defects, acquired and developmental, is very great. Lane has pointed out an extensive pathology for the colon resulting from mechanical causes.

It is true that normal morphography of the colon will not exempt it from certain inflammations, neoplastic growths and other pathology, but it is also true that a deviated morphography will directly predispose to more pathologic changes than any other one condition.

I desire to express my appreciation for assistance given me in this study by Professor G. L. Streeter, now of the research department of embryology at Johns Hopkins University, and Dr. R. A. McGarry, formerly of the anatomical staff of the University of Michigan.

BIBLIOGRAPHY.

1. Cunningham. Text-book of Anatomy.
2. Davis. Text-book of Applied Anatomy.
3. Mall. Johns Hopkins B., Nos. 90–91, Sp. Oct., 1898.
4. Streeter. Private communication.
5. Cohnheim. Diseases of the Digestive Canal, p. 267.
6. Schafer. Text-book of Microscopic Anatomy, p. 556.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
1	Touching middle inguinal line; retrocurved; low, touching. ligament.	Middle inguinal ligament line; large, 8 cm. wide.	Normal.	Low; 1 cm. above crest of ileum line 12 cm. wide.	Above costal line; acute angle.	Normal.	Fig. 8; double saeculated.	Splenic flexure obstruction; constipation.
2	Outside middle inguinal line; normal.	Normal.	Normal.	Saeculated 2.5 cm. at iliac crest line.	Splenic flexure above costal line; acute angle.	Outside middle inguinal line.	Normal.	Obstruction at splenic flexure.
3	High, 2 cm. above iliac crest line.	Outside right middle inguinal line.	Obtuse.	Normal.	Normal.	Normal.	Normal.	Incomplete descent of cecum.
4	Saeculated at middle inguinal line.	Normal.	Obtuse.	Normal.	Obtuse.	Normal.	Fig. 8; across entire pelvis.	Adhesions in upper abdomen; constipation.
5	Deep pocket form; outside middle inguinal line.	Normal.	Obtuse.	High and large.	Right angle.	Large.	Sigmoid form above iliac crest line saeculated.	Atonic colon; dilatation and constipation.
6	Saeculated, low, near pubis.	Normal.	Obtuse.	At umbilicus; festooned.	Acute angle; on level of hepatic flexure.	Normal.	Normal.	Lax abdominal wall.
7	Normal.	On right inguinal line.	At level of umbilicus.	Oblique upward position.	Very high.	Normal.	Saeculated, from umbilicus to pubis.	Constipation.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
8	Inside middle inguinal line.	Normal.	High.	Normal.	Low, below costal marginal line.	Normal.	Normal.	Normal Function
9	Sacculated on middle inguinal line.	Small.	Coiled.	Normal.	High at 8th rib.	Normal.	Sigmoid flexure entirely above iliac crest line.	Persisting embryological type of cecum.
10	Deep pocket form.	Normal.	Normal.	Festooned below umbilicus.	Normal.	Normal.	Normal.	Embryological type of cecum; thin abdominal wall.
11	Inside middle inguinal line; deep pocket form.	Short.	Obtuse and low.	Oblique below umbilicus.	Above 10th intercostal space.	Normal.	Without flexure.	Normal function.
12	Pocket form.	Large, 4 cm. wide.	Low, below costal marginal line.	Sacculated 2 cm. below umbilicus.	1 cm. below cost; marginal line; acute angle.	Dilated.	1 loop in right pelvis.	Acute obstruction at splenic flexure.
13	Normal.	Normal.	Obtuse.	Normal.	High.	Normal.	Sigmoid flexure at iliac line.	Normal Function
14	Normal.	Large.	Closely coiled.	Festooned at umbilicus.	High, at 7th rib.	Normal.	Fig. 8.	Some atony of ascending colon; narrow hepatic flexure.
15	Entirely in pelvis.	Looped in upper portion.	Obtuse.	Festooned within 2 cm. of inguinal line.	At level of costal line.	Normal.	Normal.	Atony.
16	Sacculated in pelvis.	Inside middle inguinal line.	Acute angle.	Reaches pubis; sacculated.	2 cm. below costal line; acute angle.	Short.	Double sigmoid form.	Abdominal wall lax; obstruction at splenic flexure; constipation.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
17	Normal.	Large; constriction at upper end.	Obtuse.	Festooned; sacculated 2 cm. from pubis; constricted at upper end.	Obtuse.	Small.	Sacculated and constriction at rectal junction.	Congenital strictures or acquired from obstructions.
18	Sacculent; touches rectum.	Short.	Obtuse; low.	High.	2-ply fold.	Large.	No sigmoid form; pelvirectal flexure.	Enormous liver, causing displacement.
19	Large; low.	Oblique.	Normal.	4 cm. below inguinal line.	Normal.	Normal.	Normal.	Atony; lax abdominal wall; marked dilatation of entire colon.
20	Sacculent above iliac line 3 cm.	Short.	Acute angle.	Large; above umbilicus.	Acute angulation.	Small.	Pelvirectal flexure.	Atony; obstruction from acute flexures.
21	Tobacco-pouch form; lower border at level of umbilicus.	High, long loop above costal line.	Normal.	Large.	Acute.	Normal.	Large sacculation.	Adhesions in g. b. area; atony of sigmoid.
22	High above umbilical level.	Very short, not well developed.	Normal.	Normal.	Normal.	Normal.	Normal.	Head of colon undescended.
23	Oblique; large.	Oblique.	Obtuse.	High.	Obtuse.	Normal.	Sigmoid extends well across pelvis to right side,	Adhesions in epigastric region; Constipation from pelvirectal contraction.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
24	Large, oblique.	Angulated at cecum.	Obtuse.	A loop descends to level of 1 cm. above umbilical level.	Low.	Two agglutinations, one at and one above costal line.	Straight.	Excessive growth of colon; agglutination at g. b.
25	Normal; appendix at right angle.	Normal.	Normal.	Festooned.	Normal.	Normal.	Normal.	Relaxed gastrocolic mesentery.
26	Normal; appendix at end of cecum.	Normal.	Obtuse.	Normal.	Obtuse.	Enlarged at lower part.	Agglutinated sigmoid at level of iliac line.	Agglutination of sigmoid segments.
27	Pouch-like form.	Narrowed toward hepatic flexure.	Narrowly constricted.	Normal.	Double angulation.	Long.	Coiled and a sharp pelvirectal flexure; atony evident.	Constriction at hepatic flexure from adhesions; agglutinated sigmoid in pelvis.
28	Retrocoiled position.	Parallel with cecum which makes an inside limb.	Acute.	Large.	Acute.	Normal.	Angulation obtuse.	Adhesions in iliac region; acute hepatic and pelvic flexure.
29	Large, irregular form.	Vertical.	Large, dilated.	Normal.	Obtuse.	Large.	Dilated and agglutinated.	Atony; constipation.
30	Large on medial side.	Narrow.	Obtuse.	Large, atonic; saeculated at left side.	Acute.	Normal.	Dilated before the pelvirectal flexure.	Constipation; embryological or pathological constriction in ascending and pelvic colons.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
31	Curved posteriorly.	Large and sacculated.	Normal.	Large, atonic form; suspended under ensiform cartilage.	Normal.	Narrow in first portion.	Sigmoid form and an extra coil.	Dilatations and constrictions; motility poor.
32	Pouch form.	Vertical.	Obtuse.	Very large.	Large and massed.	Large.	Agglutinated.	Atony and dilatation of transverse and pelvic colons.
33	Low in pelvis.	Slightly obliquc.	Looped anteriorly on ascending colon.	Very large, reaches to umbilicus lower boudary.	Obtusc.	Normal.	Pouched.	Constipation from pelvic colon.
34	Oblique pouch.	Short.	Obtuse.	Very largc.	Adhesions (peritoneal band, large).	Normal.	Normal.	Dilated transverse colon from adhesions in splenic area.
35	Irregular pouch form; appendix toward the outside.	Narrow and short.	Obtusc.	Normal.	Obtuse.	Obliquc.	Normal.	
36	High and axis is parallel with iliac crest.	Obliquc.	Obtuse and large.	Normal.	Acute.	Irregular in size.	No acute angulations.	Delayed motility from constriction at splenic flexure.
37	Large.	Short.	Obtuse.	Largc.	Looped and adherent at subcostal angle.	Normal.	Normal.	Adhesions in epigastric area.
38	Normal.	Vertical.	Obtuse.	Festooned.	Obtuse; an extra angulation.	Bends numerous.	Obtuse.	Long colon.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
39	Low in pelvis.	Normal.	Pushed down by large g. b.	Moderately low.	Obtuse.	Normal.	Very obtuse.	Lax gastrohepatic mesentery.
40	At level of umbilicus; appendix large.	Normal.	Normal.	Large et sacculated.	High et angulated.	Large (moderately).	No marked sigmoid form.	Acute angulation at splenic flexure causes dilatation of transverse colon.
41	Sac form.	Short and small.	Obtuse.	Normal but long.	Two loop form.	Short and lower half flexed just above iliac line.	Very little angulation.	Motility possibly delayed.
42	Begins 2.5 cm. below iliac line; appendix adherent to sigmoid.	Short and vertical.	Acute.	Oblique toward spleen.	High and obtuse.	Long and bent toward median line.	Normal.	A long colon; adhesions.
43	Normal.	Vertical.	Obtuse.	Oblique.	Obtuse.	Small.	Normal.	Stomach displaces t. colon slightly.
44	Oblique.	Short.	Obtuse.	Oblique and distended.	Acute.	Small.	Sigmoid form.	Splenic flexure may delay motility.
45	Long axis almost parallel; distended.	Short.	Acute obstruction possible.	Oblique, reaches just below umbilicus.	Obtuse.	Normal.	Small and 2 free coils.	Adhesions in g. b. inhibition of peristalsis beyond g. b.
46	Normal.	Fig. 8, form.	Obtuse.	Large toward splenic flexure.	Normal.	Small.	Long and dilated into a sac form.	Delayed motility at splenic and pelvirectal flexure; long colon.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
47	Sausage shaped and parallel with iliac line.	Short.	Large loop.	Oblique.	Obtuse.	Large.	Double S form.	Adhesions about umbilicus and cecum.
48	Slender; appendix at distal end.	Oblique.	Obtuse and low from edge of gall-bladder.	Slightly oblique.	Low, obtuse.	Sigmoid form.	Normal.	Liver and g. b. are low.
49	Appendix adherent in pelvis.	Normal.	Obtuse.	Slightly sacculated about center.	Obtuse.	Normal.	Normal.	Pelvic or appendiceal adhesions in right lower pelvis; long colon.
50	In pelvis and transverse position; appendix at end of cecum.	Vertical.	Obtuse.	Normal.	Obtuse.	Normal.	One angulation.	Long; function normal.
51	In pelvis.	Bent a little.	Obtuse.	Normal.	Obtuse.	Normal.	Normal.	Function and form about normal.
52	Normal.	Vertical.	High.	Normal.	Right angles.	Normal.	Normal,	Normal.
53	Large.	Large; vertical.	Normal.	Large.	Obtuse.	Lower end coiled sacculated.	Multiple coils.	Delayed motility at splenic and pelvic flexures.
54	Above level of umbilicus.	Short.	Obtuse.	Normal.	Clothes-pin type.	Normal.	Sacculated.	Constipation from dilated sigmoid.
55	Pouch; adherent appendix kinked.	Vertical.	Large.	Normal.	Obtuse.	Constriction about middle portion.	Dilated.	Long colon; slow motility; constipation.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
56	Oblique.	Normal.	Obtuse.	Normal.	Acute.	Normal.	Not angulated.	Long colon; slow motility; constipation.
57	Pouch.	Short.	Obtuse.	Normal.	.....	Normal.	Normal.	Normal.
58	Large.	Oblique.	Acute.	Festooned.	Not drawn.	Normal.	Long.	Hepatic flexure delay.
59	Normal.	Normal.	Obtuse.	Normal.	Normal.	Normal.	S form.	Normal.
60	Normal.	Normal.	G. b. adhesions.	Normal.	Normal.	Normal.	Normal.	Adhesions around g. b.
61	Normal.	Normal.	Normal.	Normal.	Normal.	Normal.	Normal.	Normal.
62	Normal.	Oblique.	Normal.	Normal.	Normal.	Normal.	Normal.	Normal.
63	Normal.	Vertical.	Acute.	Normal.	Lower than the hepatic.	Normal.	Normal.	Gastrohepatic mesentery is weak.
64	Large.	Vertical.	Obtuse.	Normal.	Obtuse and lower than hepatic flexure.	Normal.	Normal.	Epigastric adhesions.
65	Normal.	Normal.	Obtuse.	Normal.	Obtuse.	Normal.	Sigmoid adhesions.	Agglutinated sigmoid flexure; constipation.
66	Normal.	Short.	Acute.	Displaced slightly downward by large stomach.	Acute.	Normal.	No angulations.	Normal.
67	Normal.	Normal.	Normal.	Normal.	Obtuse.	Normal.	Sacculated slightly.	Some constipation.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
68	Normal.	Normal.	Normal.	Suspended.	.....	Normal.	Pelvirectal flexures; dilation.	Epigastric adhesions.
69	Massive size, low.	Curved outward.	Normal.	High.	Obtuse.	Large at lower end.	Constricted part before angulation at rectal junction.	Atony of cecum and lower end of descending colon.
70	Adhesions; appendix at outer side, tip under liver.	Short.	Narrow and long fold.	Oblique.	Obtuse.	Oblique and dilated.	Acute angle.	Adhesions in g. b. area; hypertrophy of liver.
71	Appendix at end of cecum.	Short.	Normal.	Slightly oblique.	Acute.	Normal.	No flexures.	Normal.
72	Normal; long, free appendix.	Lax.	Obtuse.	Normal.	Normal.	Normal.	Dilated.	Atony or pelvic colon; constipation.
73	Normal; appendix at end of cecum.	Vertical.	Obtuse.	Dilated slightly.	Normal.	Small.	Dilated and in folds.	Atony of pelvic colon; constipation.
74	Normal.	Normal.	Obtuse.	Oblique.	Obtuse.	Normal.	No angulation.	Delayed motility up to splenic flexure.
75	Normal; appendix at end of cecum.	Short.	Obtuse.	Slightly dilated.	Normal.	Normal.	Normal.	Delayed motility up to splenic flexure.
76	Large.	Large.	Acute; lumen obstructed by gall-stone.	Festooned slightly.	Normal.	Normal.	Normal.	G. b. adhesions.
77	High; sac form.	Short.	Obtuse.	Normal.	Normal.	Normal.	Normal.	Appendix just below liver.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
78	Normal.	Normal.	Obtuse.	Normal.	Normal.	Normal.	Normal.	Normal.
79	Normal.	Short.	Obtuse.	Normal.	Obtuse.	Normal.	Normal.	Enlarged liver; low hepatic flexure.
80	Small; appendix on outside.	Normal.	Normal.	Normal.	Constricted in one part.	Normal.	Normal.	Delayed motility to splenic flexure.
81	Normal; appendix retrocecal.	Normal.	Obtuse.	Normal.	Obtuse.	Normal.	No angles.	Epigastric adhesions.
82	Normal.	Short.	Normal.	High.	Normal.	Normal.	Pelvirectal flexure acute.	Atony of entire colon.
83	Low.	To right of midline.	Acute.	Lax.	Long curved flexure.	Normal.	Normal.	Incomplete rotation of colon; delayed motility.
84	Normal.	Normal.	Long fold.	Oblique.	Obtuse.	Normal.	Normal.	Adhesions at gall-bladder.
85	Normal.	Normal.	Obtuse.	Normal.	Narrowing.	Normal.	No angulation.	Normal F.
86	Transverse; large appendix.	Normal.	Obtuse.	Normal; high.	Obtuse.	Short.	Large sigmoid mass.	Appendiceal adhesions; dilated sigmoid.
87	Low; free appendix.	Short.	Dilated; adherent.	High; adherent.	Adherent.	Normal.	No angulations.	G. b. and duodenal adhesions.
88	Large.	Large.	Acute.	Large, behind stomach.	Normal.	Normal.	Normal.	Duodenal adhesions.
89	Normal.	Oblique.	Acute.	Normal.	High.	Normal.	No angulation.	Normal.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
90	Low; appendix at end of cecum.	Normal.	Narrow and duplicate folds.	Normal.	Normal.	Normal.	Dilated.	Enlarged liver displacing hepatic flexure.
91	Normal.	Normal.	Acute.	Oblique.	Normal.	Normal.	Normal.	Normal.
92	Low; adherent; transverse.	Small.	Adherent to g. b.; massed.	Irregular.	Lax.	Lax.	Normal.	Pelvic or appendiceal adhesions; g. b. adhesions.
93	Normal.	Normal.	Low.	Normal.	Normal.	Normal.	Normal.	Enlarged g. b.
94	Dilated; oblique; low in pelvis.	Normal.	Acute; at 10th rib.	Normal.	Obtuse.	Normal.	Normal.	Pelvic adhesions.
95	Dilated; appendix at end of cecum.	Normal.	Low.	Oblique.	Obtuse.	Transverse fold at lower end.	Normal.	Narrow hepatic flexure.
96	Normal.	Normal.	Acute.	Low at right end; oblique.	Obtuse.	Normal.	Normal.	Adhesions in g. b. area.
97	Normal.	Normal.	Obtuse.	High suspension.	Normal.	Small.	Small.	Epigastric adhesions.
98	Sac form.	Short.	Low; coil form.	Very oblique; under stomach.	Obtuse.	Long; sac form at lower end.	Much dilated.	Constipation; sigmoid dilatation.
99	Large.	Normal.	Obtuse.	Oblique; high.	High; obtuse.	Constriction in upper one-third.	No angles.	Short mesentery.
100	Normal.	Normal.	Normal.	Low at right end; oblique.	Acute.	Normal.	Slight angulation.	Lax. mesenteric support of colon.
101	Normal.	Normal.	Acute; g. b. enlarged.	Festooned to umbilicus.	Acute.	Normal.	Normal.	G. b. adhesions.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
102	Normal.	Normal.	Obscured by liver.	Oblique.	High; wide coil.	Obliquely inward.	Large coil to right pelvis.	Adhesions of sigmoid.
103	Normal.	Normal.	Normal.	Normal.	High.	Normal.	Normal.	Normal.
104	Low.	Large.	Normal.	Festooned.	Large curve.	Large.	Angulation.	Sharp sigmoid angulation.
105	Sac form; appendix at end of cecum.	Normal.	Obtuse.	A giant colon; lower border below iliac line.	Normal.	Large.	Dilated.	Congenitally large colon (Hirshsprung's type).
106	Very large; appendix adherent.	Very short.	Obtuse.	Large; sac form.	Narrow.	S form in middle one-third.	No angulation.	Atony and dilatation of entire colon.
107	Transverse.	Short.	Not drawn.	Lax; low, 2 cm., from iliac line.	Not drawn.	Large.	.....	Appendiceal adhesions.
108	Normal.	Normal.	Obtuse.	Festooned.	Obtuse.	Normal.	Large upper part of sigmoid.	Constipation; right inguinal hernia of small intestine.
109	Low.	Normal.	Acute.	Low, to umbilicus.	Acute.	Wide at lower end and saccular.	Sacculated.	Atony of entire colon.
110	On right side; not rotated.	Oblique.	Acute.	Low, to iliac line.	Obtuse.	Normal.	Slightly sacculated and to right.	Adhesions about cecum.
111	Oblique.	Oblique.	Obtuse.	Low, below umbilicus 5 cm.; dilated.	Obtuse.	Normal.	Adhesion; position normal.	Delayed motility in transverse colon; adhesions.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
112	Normal.	Normal.	Obtuse.	Low, 8 cm. below umbilicus; dilated.	Normal.	Normal.	Normal.	Delayed motility in transverse colon; adhesion.
113	Normal.	Normal.	Fold.	Low; 3 cm. below umbilicus; dilated.	Obtuse.	Normal.	Normal.	Delayed motility in transverse colon.
114	Normal.	Normal.	Obtuse.	Lax; 2 cm. low.	Obtuse.	Normal.	Normal.	Long colon.
115	Nondescended.	High; folded.	High; acute.	High; behind stomach.	Normal.	Normal.	Tumor of sigmoid filling entire left abdomen.	Tumor of sigmoid.
116	Nondescended.	Short.	Obtuse.	Lax; dilated.	Obtuse.	Normal.	Normal.	Atony of ascending and transverse colons.
117	Appendix at end of cecum.	Normal.	Obtuse.	Two horizontal folds, one at hepatic and one at splenic area.	Folded.	Lax.	Multiple coils.	Long colon; lax support.
118	Normal.	Short; oblique.	Normal.	Oblique.	Obtuse.	Normal.	Sigmoid massed with appendix on right side; rectum narrow.	Hypertrophy of sigmoid; adhesions of appendix, cecum and sigmoid; constipation.
119	Normal; appendix at end of cecum.	Normal.	Obtuse.	Normal.	High; obtuse.	Normal.	Sigmoid 4 cm. above umbilicus; dilated.	Adhesion of sigmoid.
120	High; appendix at end of cecum.	Short.	3 angles.	Oblique; high; lax.	Obtuse.	Normal.	Sigmoid 1 cm. above umbilicus.	Contracted colon.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
121	3 cm. from midline; appendix on end.	Oblique to g. b.	Acute.	Low, 3 cm.; coil of transverse colon in iliac fossa.	Acute.	Normal.	No angulation.	Adhesions causing coiling of transverse colon on left side.
122	Normal.	Normal.	Obtuse.	Low, 16 cm. below umbilicus; very lax; slightly sacculated.	Low; acute.	Lax.	Normal.	Lax abdominal wall; transverse colon in lower pelvis; adhesions.
123	Normal; appendix at end.	Short.	Acute.	Lax; 3.5 cm.; oblique.	Acute.	Normal.	One flexure.	Long mesentery.
124	Normal.	Normal; lax.	Obtuse.	Oblique.	High; obtuse.	Normal; long.	One coil.	Long colon.
125	Large; sacculated.	Sacculated.	Normal.	Oblique.	Angulated.	Normal.	Flexure to right fossa; sacculated.	Constipation from dilated sigmoid.
126	Normal.	Short; g. b. large.	Obtuse.	Oblique; dilated.	Obtuse.	Normal.	Approaches right iliac fossa.	Adhesions of cecum appendix and sigmoid.
127	Normal.	Normal.	Adhesion; folded; angulated.	Normal.	Normal.	Lax.	Normal.	G. b. adhesions.
128	Normal; appendix at end.	Normal; large.	Acute.	Position normal.	Obtuse.	Normal.	Agglutination.	Tumor of sigmoid; dilated colon throughout.
129	Normal.	Short; large liver.	Obtuse.	Low, 6 cm. below umbilicus.	Acute.	Normal.	Normal.	Weak gastrohepatic mesentery.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
130	Pocket form.	Short.	Coil.	7 cm. low; left half pp. to splenic flexure.	Double u.	Normal.	Normal.	Irregularity in development; many constricted segments; very long.
131	Very oblique; low in pelvis; adhesions.	Oblique.	Obtuse.	Low 7 cm.; lax.	Angulated.	Normal.	Normal.	Dilated cecum; pelvic adhesions; lax mesentery.
132	High.	Long.	Acute; irregular.	10 cm. low.	Acute.	Normal.	Normal.	Lax abdominal wall; ptosis of transverse colon; very long.
133	Normal.	Short.	Obtuse.	Lax; low 12 cm.	Obtuse.	Normal.	No angulation.	Ptosis of transverse colon.
134	Normal.	Normal.	Low; stomach displaced.	Normal.	Normal.	Normal.	Normal.	Ptosis of stomach.
135	Dilated.	Absent.	Absent.	Oblique.	Acute.	Normal.	Normal.	Enlarged liver, displaced colon; strictures.
136	Normal.	Short.	Obtuse.	Low 8 cm.	Obtuse.	Not drawn.	Normal.	Normal.
137	Normal.	Short.	Obtuse.	Low 3 cm.	Obtuse.	Acute.	Normal.	Ptosis of stomach and transverse colon.
138	Normal; appendix at end.	Normal.	Angulated.	Low 5 cm.	Acute.	Pocket to left.	High to umbilicus.	Diverticulum of descending colon from adhesions.
139	Normal.	Normal.	Acute.	Low 6.5 cm.	Acute.	Normal.	Large and in folds.	Constipation from sigmoid; ptosis of transverse colon.
140	High.	Stricture; shore.	Obtuse.	Low 5 cm.	Low.	Normal.	Normal.	Normal.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
141	Nearly transverse 2 cm. from Poupart's ligament.	Oblique.	Low from large liver; l. is 3 cm. f. i. l.	Very oblique; nearly covered by liver.	High; 2–3 cm. above ensiform cartilage; obtuse angle.	Long.	No angulation.	Hypertrophied liver, displacing hepatic flexure.
142	Low in pelvis.	Narrow; displaced medially by liver.	High; adhesions probable.	Below umbilicus; dilated.	Anterior and posterior limbs in apposition; anterior, posterior to within 1 cm. of iliac line.	Circular constrictions marked every 3 cm.	No angulation.	Ptosis of transverse colon.
143	High.	Loops down low in pelvis.	High.	Hidden by sigmoid.	.....	Normal.	Almost entirely above umbilicus, nearly fills abdomen.	Tumor of sigmoid.
144	Normal; appendix on end.	Short.	Low.	Looped at hepatic end.	High.	Normal.	One loop across right iliac fossa in prox. with cecum; angulation acute.	Adhesion of appendix and sigmoid.
145	Large; 7 cm. wide.	Oblique toward.	Normal.	Oblique.	Acute.	Abundant length; lax.	Close Fig. 8.	Atony of cecum.
146	Oblique; appendix at end.	Oblique.	Obtuse.	Loops on right side below umbilicus 2 cm.	High; obtuse.	Lax.	Close coil in left iliac fossa.	Transverse colon ptotic; constipation from sigmoid.
147	Pocket form; oblique.	Short.	Normal.	Dilated at and below umbilicus.	Large and high.	Small.	Imperfect Fig. 8; rectum far to right.	Ptosis of transverse colon.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
148	Appendix 15 cm. long; distal end touches liver.	Short; large.	Large.	Festooned.	High; acute.	Long.	Dilated.	Delayed motility to splenic flexure; appendix adherent to liver.
149	Pouch (large) 9 cm. wide.	Short.	Obtuse.	A loop descends to umbilicus.	High; obtuse angle.	Normal.	Dilated; pelvic angle is acute.	Embryologic pouch of cecum.
150	Fish-tailed; transverse.	Normal.	Low.	Lax; level with umbilicus.	Normal; high.	Lax; coil in mid-abdomen 1 cm. long.	One slight angulation.	Large liver.
151	Slightly large; appendix retrocecal, 15 cm. long.	Short; large at bottom.	Obtuse.	Festooned (not low).	High; acute.	Long.	Pelvirectal flexure (not acute).	Pelvic adhesions of cecum; constricted portion.
152	Low.	Normal.	Coil.	High; adhesion with stomach.	Normal.	Normal.	Normal.	Inflammation about cecum.
153	Low in pelvis; oblique.	Oblique.	Normal.	Posterior to stomach.	Normal.	Normal.	Slight angulation.	Very large stomach; adhesions about cecum.
154	Dilated; appendix at end.	Narrows toward hepatic flexure.	Normal.	Dilated; festooned.	Normal.	Normal.	Looped and dilated.	Constipation from sigmoid; ptosis of transverse colon.
155	Normal; appendix at end.	Normal.	Normal.	Oblique.	Obtuse.	Long.	Normal; no sharp angulation.	Adhesion of appendix, proximate one-third.
156	High; appendix at end.	Oblique to ensiform cartilage.	Normal.	High.	Obtuse.	Normal.	Vertical 8.	Normal function.

No.	Cecum.	Ascendlng colon	Hepatic flexure	Transverse colon	Splcnic flexure	Descending colon	Pclvic colon	Inference
157	Low; small appendix retrocecal.	Short.	Low.	Small.	Looped flexure.	Small.	No angulation.	Small gut throughout.
158	Low; oblique; appendix on medial side.	Oblique; slightly large.	Acute.	Irregular in size; high; stomach is large.	Normal.	Very large at lower end.	Dilated; close coiled (double).	Agglutinated pelvic colon; adherent to appendix.
159	Slightly pouched.	Lax.	Large; adhesions?	High; horizontal.	Normal.	Normal.	Normal.	G. b. adhesions.
160	High; appendix retrocecal.	Large.	Obtuse; adhesions at g. b.	Festooned, boat-shaped.	Complete coil.	Normal.	No sigmoid.	Dilated colon to splenic flexure; g. b. adhesions.
161	Transverse kink of ileum; "boot-shape with A C."	Vertical.	Obtuse.	High.	Obtuse.	Long.	Horizontal Fig. 8 form.	Lane's kink of ileum; cecum at right angle to ascending colon.
162	Sac form; horizontal; not completely rotated; appendix on right side.	Oblique; transverse.	Acute; low.	Lax.	High; obtuse.	Normal.	Single bend.	Cecum pouched form in pelvis.
163	Low in pelvis; oblique.	Oblique.	Obtuse.	Festooned to umbilicus.	Obtuse.	Normal.	Twisted.	Adhesions of appendix.
164	Pocket form.	Vertical.	Obtuse.	Festooned above umbilicus.	Obtuse.	Oblique to pelvis.	Normal.	Normal.
165	Low in pelvis; appendix at end of cecum.	Normal.	.....	High.	Obtuse.	Normal.	Normal.	Cecoappendiceal adhesions et g. b. and duodenal adhesions.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
166	Pouch form; low in pelvis.	Normal.	Acute.	Lax; oblique on left side.	Normal.	Normal.	Two angles.	Embryologic type of colon.
167	Large; low; appendix on outside.	Normal.	Obtuse; high.	Lax; low at et below umbilicus.	Lax; large.	Dilated at mid-portion.	No angulation.	Adhesions about appendix.
168	Normal.	Normal.	Normal.	Normal.	Level with hepatic flexure.	Normal.	Dilated and raised above umbilicus.	Atony and delay at sigmoid?
169	Large; appendix large.	Slightly oblique.	Normal.	Dilated.	High; narrow.	Normal.	No "S" form.	Delayed motility to splenic flexure.
170	Low; near bladder; oblique.	Oblique.	Slight.	Oblique to splenic flexure.	Normal.	Normal.	No "S" form.	Appendiceal adhesions.
171	Oblique; appendix adherent.	Oblique; slightly dilated.	Acute.	Obliquely downward 2–3.5 cm. below umbilicus.	Very low; 3 cm. above iliac line.	Obliquely toward pubes.	One angle at rectum.	Adhesions in left abdomen.
172	Low; deep pocket; large.	Large.	Double loop in epigastric regular and umbilicus regular.	Lax; dilated irregularly.	Normal.	Long.	Contorted and dilated.	Unusual length of colon; constipation.
173	Small.	Very narrow.	Normal.	Two loops crowded high up in epigastrium; irregular in size.	Acute.	Normal.	Large, extending to ileocecal region.	Tumor of mesentery; constipation; duodenal ulcer with adhesions.
174	Low; appendix at end of cecum.	Short.	Acute.	Festooned to level of iliac line.	Acute.	Normal.	No "S" form.	Ptosis of transverse colon; atony and delayed motility.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
175	Oblique; dilated.	Oblique.	Unusually high.	Ptosis; 1 cm. below umbilicus; descends low on left side.	Clothes-pin.	Normal.	One angle.	Insufficient supports to colon.
176	Triangular; appendix at end of cecum.	Horizontal; adherent to liver and g. b.	Normal.	Lax; double looped low in pelvis.	Obtuse.	Normal.	Normal; one loop.	Ptosis of colon; inadequate support.
177	Oblique.	Oblique.	Acute.	Slightly low; stomach is low.	Obtuse.	Normal.	Normal angulation.	Normal.
178	Normal; appendix at end of cecum.	Short.	Acute.	Enlarged at left side; 1 cm. below umbilicus.	Acute.	Normal.	Normal.	Ptosis of stomach and transverse colon.
179	Fish-tailed at midline.	Lower part horizontal; upper part vertical.	Obtuse.	Slightly dilated.	Loop extended to outside.	Lower half constricted.	Pelvirectal flexure.	Adhesions about cecum; embryologic diverticuli.
180	Slightly dilated.	Vertical.	Normal.	Oblique to splenic flexure.	Not drawn.	Normal.	Not drawn.	Normal.
181	Normal.	Normal.	Normal.	Normal.	Not drawn.	Normal.	Not drawn.	Normal.
182	Normal; appendix retrocecal.	Normal.	Normal.	Looped slightly in one place.	Acute.	Short.	Normal.	Normal.
183	Large; appendix retrocecal.	Normal.	Normal.	Dilated, 6 cm. wide.	Constriction of splenic flexure.	Oblique.	No "S" form.	Motility of transverse colon slowed.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
184	High; appendix at end of cecum.	Normal.	Acute.	Normal.	Normal.	Short.	One angle.	Undifferentiated splenic and sigmoid flexures; embryologic disturbance of growth.
185	Pouched; oblique.	Oblique.	Well outside of g. b.; a stone is shown in g. b.	Lax; irregular.	Obtuse.	Small.	No angulation.	Gall-stone in g. b. causing hepatic flexure adhesions.
186	Retrocecal position of appendix; very large cecum.	Dilated.	Normal.	Large.	Long.	Normal.	Single long loop to umbilicus.	Adherent appendix; atonic bowel.
187	Normal.	Short.	Obtuse.	Large; oblique.	High.	Return loop extending as high as the stomach.	Straight.	Early peritoneal adhesions.
188	Small pouch; oblique.	Narrow.	Obtuse.	Below umbilicus.	Normal.	Normal.	No flexure.	Inadequate support of transverse colon.
189	Pouch form.	Narrow.	Obtuse.	Below umbilicus.	Made of anterior et posterior limbs of colon in anterior posterior position.	Normal.	Double loop; saculated somewhat.	Enlarged stomach displacing transverse colon.
190	Low; oblique.	Oblique.	Obtuse.	Touches iliac line.	Obtuse angle.	Normal.	No angulation.	Gastrohepatic mesentery inadequate.
191	Normal.	Normal.	Normal.	Ptosis; below iliac line 1 cm.	Obtuse.	Normal.	No "S" formed.	Inadequate motility and support.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
192	Small; appendix at end of cecum.	Normal.	Normal.	Ptotic below umbilicus; dilated; oblique.	Acute.	Small.	Slightly sacculated; long.	Ptosis of colon; contracting descending colon; inadequate support; constipation.
193	Horizontal; tip at left of umbilicus.	Horizontal.	Low; acute.	Normal.	Normal.	Small.	Normal.	Pelvic adhesions.
194	Slightly pouched.	Normal.	Normal.	Normal.	Anterior and posterior arms in anteroposterior position.	Normal.	No angulation.	Some dilation to splenic flexure.
195	Slightly pouched.	Vertical.	Obtuse.	Lax.	Low.	Normal.	One slight angle.	Normal.
196	Large pouch; appendix retrocecal.	Large.	At g. b. probably adherent.	Ptosis of transverse colon to iliac line.	At 10th rib; acute.	Normal.	Pelvirectal flexure.	Adhesions of appendix and cecum.
197	High.	Oblique.	Acute.	Ptosis of colon directly after leaving hepatic flexure to long colon from iliac line.	Obtuse.	Normal.	Double coil sacculated.	Delayed motility to splenic flexure; inhibited peristalsis.
198	Normal.	Normal.	Normal.	Oblique to spleen.	Obtuse.	Normal.	Fig. 8.	Fig. 8.
199	Normal.	Normal.	Obtuse.	Normal.	Obtuse.	Normal.	Displaced upward by ovarian cyst.	2 large ovarian cysts; colon above umbilicus.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
200	Enormously enlarged.	Normal.	Normal.	Oblique toward spleen.	Large agglutinated mass 3 cm. below umbilicus.	Normal.	No angulation.	Tumor in left abdominal quad.
201	Normal; appendix at end of cecum.	Normal.	Massed.	Ptosis below iliac line; on right side; oblique to spleen.	Large; suggesting delay.	Small.	No "S" formed.	Inadequate colonic support.
202	Low; vertical.	Vertical.	Acute.	Ptosis on right side to inguinal ligament.	Loop.	Small.	But slight angulation.	Inadequate support.
203	Low; large.	Oblique.	Obtuse.	Normal.	Obtuse.	Normal.	No angles.	Normal.
204	Normal.	Vertical.	Obtuse.	Festooned level of umbilicus.	Obtuse.	Normal.	No angles.	Normal.
205	Very large.	Very large.	Acute.	Large; level with umbilicus.	Acute angle of splenic flexure.	Normal.	Sacculated.	Dilation to splenic flexure; atony constipation.
206	Low; oblique.	Vertical; large.	Normal.	Large.	Normal.	Large.	No angles.	Constipation from pelvirectal flexure.
207	Normal.	Vertical.	Normal.	Dilated.	Normal.	Long.	One angle.	Slight delay at splenic flexure.
208	Triangular.	Vertical.	Obtuse.	Normal.	Obtuse.	Normal.	Dilated; acute angle.	Constipation.
209	Low; large appendix.	Vertical.	Obtuse.	Normal.	Normal.	Normal.	Part in pelvis and part above iliac line.	Normal.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
210	High.	Oblique; short.	Normal.	High on right side, level with umbilicus on left.	Normal.	Upper portion very large.	No angles.	Atony.
211	Appendix at end.	Large; vertical.	Acute.	Festooned.	Obtuse.	Large.	Pelvirectal may be constricted.	Narrow pelvirectal flexure, causing dilatation of colon.
212	Large; appendix at end.	Large; vertical.	High; large; adhesions.	High.	Normal.	Lax.	Large flexure occupying right et left ilia.	Adhesions of sigmoid and appendix; constipation.
213	Large.	Large.	High.	Oblique downward.	Obtuse.	Normal.	Normal.	Normal.
214	Sac form transverse et reaches to left iliac line.	Horizontal and vertical.	Low.	Lax and below umbilicus.	Low.	Normal.	Dilated.	Constipation; lax gastrohepatic mesentery.
215	Triangular.	Vertical.	Obtuse.	Festooned below umbilicus.	Obtuse.	Normal.	Not angulated.	Ptosis; constipation.
216	In left iliac fossa; large.	Entire colon loops toward spleen.	Wanting.	Wanting.	Obtuse loop.	Irregular.	Two angles.	Entire colon is a loop from left iliac fossa to spleen and return; nonrotation.
217	Double cornu.	Short.	Normal.	Normal; high.	High; obtuse.	Narrow construction in 1st part.	Two obtuse angulations.	Normal.
218	Normal.	Short.	Fold.	High; normal.	Obtuse.	Normal.	Pelvirectal type of Hertz.	Some constipation.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
219	Normal.	Vertical.	Wide, 7.5 cm.; obtuse.	Normal.	Normal.	Complete loop in first part.	Complete loop.	Some adhesions in g. b. area; very long colon.
220	Normal.	Vertical.	Normal.	Ascending and descending portions because of very high suspension.	Normal.	Long.	Acute; two angulations.	Adhesions in upper abdomen and very long body.
221	Oblique.	Oblique.	Acute; pushed downward by large liver.	Right segment low because of large liver.	Acute; high.	Normal.	Normal.	Liver and g. b. pathology.
222	Low; kinked appendix.	Normal.	Obtuse.	Normal.	Normal.	Descends to inguinal ligament, returns by a complete loop to level of transverse colon.	No angulations; it continues the straight tube of return loop of ascending colon.	Excessive length of colon.
223	Pouch; medium; side projection; oblique.	Oblique.	Acute.	Normal.	Normal.	Normal.	Narrow; 2 angles	Embryonic type of cecum.
224	Normal; appendix at end.	Slightly oblique.	Obtuse.	Normal.	Normal; high.	Descends only half way, then has S form above iliac line.	No angles; straight tube.	Mesenteric attachment short.
225	Pocket form; appendix above iliac crest fossa.	Lax; long.	Obtuse.	Loop in epigastric region.	Looped about in splenic area.	Small.	Occupies both pelves; lax; dilated some.	Very long colon; adhesions in appendicular region and splenic area.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
226	Pouch; appendix in retroposition, adherent.	Normal.	Acute.	Below umbilicus 5 cm.	As low as hepatic.	Oblique; parallel with Poupart's ligament.	One angle.	Gastrohepatic mesentery inadequate.
227	Pouch marked; adherent appendix.	Very narrow.	Double loop.	Oblique to spleen.	Acute.	Zigzag.	Four loops.	Average diameter 1 cm.; lax; embryologic type.
228	Normal.	Vertical.	Obtuse.	Normal.	Clothes-pin form.	Normal.	Agglutinated loop form at level of iliac line.	Short colon.
229	Normal; appendix at end.	Vertical.	Complete loop.	Long distance below stomach, 1 cm. above umbilicus.	Clothes-pin form.	Normal.	Two loops.	Gastric colic ligament weak.
230	Long pouch.	Short; vertical.	Two loops.	Normal.	Obtuse.	Normal.	Long; one angle.	Embryological type of colon.
231	Dumb-bell form; touches inguinal ligament.	Long.	Normal.	Short; high.	Normal.	Long.	Slight angulation.	Very long colon and adhesions in epigastrium probable.
232	Pocket form; appendix kinked.	Vertical.	Acute.	Descended level with umbilicus.	Acute.	Normal.	One angle.	Gastrocolic ligament; lax.
233	Large transverse pouch, 8 cm. wide.	Vertical.	Acute.	Oblique toward left.	Long loop from iliac line.	Normal.	Two angles.	Lax gastrocolic ligament; embryonic cecum.
234	Pocket form.	Vertical.	Acute.	Festooned to level of umbilicus.	Acute; perhaps obstruction slight.	Small.	Two angles.	Embryonic cecum; lax gastrocolic ligament.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
235	Normal; appendix at end of cecum.	Large; vertical.	Normal.	Normal.	Normal.	Small; 1 cm. diameter.	One angle.	Normal.
236	Normal; appendix long, reaches to umbilicus.	Lax.	.....	Normal.	Two loops.	Normal.	Two complete loops.	Normal.
237	Unrotated; position is at extreme left iliac line.	On left side; short.	None.	None.	Made by ascending and descending cecum.	Within 2 cm. of ascending cecum; short coils at or just above iliac line.	Straight; oblique.	Nonrotation of cecum and ascending colon; no transverse segment; short colon as a consequence.
238	Normal; appendix at end.	Narrows toward hepatic flexure.	Acute.	Large; relaxed; descended to lower pelvis.	Low, 2 cm. above umbilicus.	Short; oblique.	Normal.	Large, ptotic stomach displacing colon downward.
239	Low, touches inguinal ligament.	Normal.	Normal.	Low at right side, below umbilicus.	Normal.	Normal.	Normal; two angles.	General slight ptosis.
240	Normal.	Short.	Acute.	Below umbilicus 1 cm.; left side is sacculated.	Made by long colonic loop.	Normal.	Two angles.	Ptosis of transverse colon; stomach is low and of water-bottle form.
241	Large; oblique.	Large; long.	Large.	Oblique to left with a complete loop across to right side.	Clothes-pin type.	Oblique.	Dilated and massed.	Long colon; atonic.
242	Above iliac line; normal.	Short; vertical.	Acute.	Descended low in pelvis.	Acute.	Oblique.	One angle.	Relaxed mesenteric support.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
243	Very large; unrotated; transverse; appendix seems to come from ascending colon.	First part blunt hood form.	Two loops to left of midline.	Only on left half of abdomen.	Acute.	Short.	Complete loop above iliac line; no loop below iliac line.	Embryonic type persisting.
244	Low in pelvis; appendix adherent.	Normal.	Two angles.	Oblique to spleen.	Obtuse.	Narrow in first part.	Two acute angles above iliac line.	
245	Transverse; adhesions.	Begins from an acute angulation.	Normal.	Oblique to spleen.	Obtuse.	Long; narrow.	Ascends as a sigmoid flexure above 10th rib line.	Tumor and adhesions about sigmoid and also cecum.
246	Pouched; transverse.	Narrowed to 2 cm.	Normal.	Dilated 2 cm. below umbilicus on its lower end.	Angulated; acute.	Normal.	Three angulations.	Dilated cecum and transverse colon; adhesions at ileocecal region?
247	Tumor of cecum; not rotated; occupies pelvis and lower abdomen 13.5 cm. pp. 1-2 wide.	Position medianward.	Large loop.	Lax and low at right et left ends.	Acute.	Normal.	One angulation.	Unrotated cecum; tumor or dilated form of cecum; gastrocolic membranes lax.
248	Pocket form; undescended.	Short.	Obtuse.	Lax; loop at right.	Loop.	Normal.	Close coil; acute angulation.	Embryonic form and position of cecum; delayed function in sigmoid.
249	Pouch; growth mostly on right side.	Normal.	Acute.	Lax.	Three loops.	Normal.	Sigmoid occupying entire pelvis and rising above umbilicus; acute angulation in	Long colon; fetal type of sigmoid; constipation from angulation of sigmoid.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
249	*Continued.*						right iliac fossa; much dilated beyond angulation.	
250	Low, 6 cm. below iliac line.	Long.	Very obtuse.	Normal.	Acute.	Normal.	Two angulations.	Adhesions about cecum.
251	Normal; funnel flexure; very large; appendix at proximal end.	Normal.	Obtuse.	Normal.	Normal.	Normal.	Loop flexure; two angles.	Normal.
252	Undescended; 6 cm. above iliac line.	Very short.	Acute.	Long; festooned deep down in pelvis.	Obtuse.	Normal; long.	One angle.	Long colon; embryonic cecum in position.
253	Normal.	Oblique.	Acute.	Normal.	Acute.	Normal.	Normal.	Marked circular constriction development throughout.
254	Undescended.	Short.	Pushed down by large liver; obtuse.	Oblique.	Acute; clothes-pin flexure.	Normal.	Two angulations.	Embryonic type of cecum.
255	Normal.	Normal.	Obtuse.	Ptotic down to umbilicus.	Obtuse.	Normal.	Two angulations.	Lax gastrocolic support.
256	Normal.	Normal.	Obtuse.	Slightly oblique.	Coiled.	Coiled 2 cm. above iliac line.	Straight.	Hypertrophied throughout.
257	Pocket form; low in pelvis.	Very long.	Obtuse.	Very high.	Obtuse.	34 cm. long.	Four angulations.	Very long.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
258	Herniated colon and appendix through inguinal ring.	Long.	Obtuse.	Oblique.	Two angulations.	Normal.	Two angles.	Long colon herniated through inguinal ring.
259	Pouched; long.	Normal.	Obtuse.	Very oblique.	Fig. 8.	Long, 32 cm.	Straight.	Normal.
260	Long pouch.	Normal.	Obtuse.	Lax.	Obtuse.	Carried across to right side; iliac fossa.	Entirely on right side.	Adhesion marking displacement.
261	Undescended pouch flexure.	Normal.	Acute.	Low; festooned.	Acute.	Normal.	Agglutinated pelvirectal flexure; Hertz.	Constipation; embryonic type of colon.
262	Normal.	Normal.	Acute.	Ptotic; lax.	Obtuse.	Normal.	Rises to 6 cm. above umbilical angulation and crosses to right iliac fossa.	Long, lax colon.
263	Dilated.	Normal.	Obtuse.	Normal.	Obtuse.	Normal.	Two angles.	Normal.
264	Normal.	Short.	Normal.	Slightly oblique.	Coiled.	Normal.	Normal.	Some delay at splenic flexure.
265	Below iliac line.	Normal.	Obtuse.	Normal; lax at left; ascends in anteroposterior to descending colon.	Slightly acute.	Normal.	Coiled and one angle.	Ptotic stomach displaces colon.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
266	Pouch.	Short.	Negative.	Short; oblique.	Negative.	Normal.	Two angles.	Very short.
267	Pouch or dilated.	Short.	Obtuse.	Dilated.	Obtuse.	Normal.	Straight.	Normal.
268	Pouch.	Long; lax.	Obtuse.	Extends low in pelvis; pouched.	Acute.	Normal.	Straight.	Long colon.
269	Pouch; dilated; low in pelvis; oblique.	Oblique to right.	Acute.	Lax; left descends to left iliac fossa; ascends in anterior posterior to descending colon.	Acute.	Normal.	Three angulations.	Long et lax.
270	Dilated.	Stricture 1 cm.	Obtuse.	Low; dilated 8 cm. below umbilicus; left part of transverse ascends in antero-posterior to descending colon.	Obtuse.	Normal.	Dilated.	Atony; constipation.
271	Dilated; pouched slightly.	Short.	Acute.	Normal.	Obtuse.	Large angulation extending upward 8 cm. above umbilicus.	.....	Very large stomach; stricture from carcinoma of pylorus.
272	Low; pouched or pocket form.	Normal.	Acute.	Left side 10 cm. below umbilicus; ascends antero-to descending colon.	Acute.	Lax.	Two angulations.	Ptotic stomach displacing colon.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
273	Normal.	Short.	Acute.	Normal.	Obtuse.	Normal.	One angle.	Large ptotic stomach displacing colon slightly.
274	Undescended.	Folded before ascending.	Normal.	Oblique.	Normal.	Very small.	Above 10th costal cartilage looped and enlarged 13 × 14 cm.; ascending and descending loop adherent.	Adhesions or tumor of sigmoid.
275	Unrotated; dilated; ileum enters from right side.	Oblique to right.	Acute.	Oblique.	Obtuse.	Normal; lax.	Two angulations.	Embryonic type of colon.
276	Partially undescended.	Short.	Normal.	High.	Normal.	Normal.	Two angulations.	Very short.
277	Pouched; dilated.	Normal.	Normal.	Two folds.	Acute.	Long.	Folded back on itself to 5 cm. above umbilicus.	Very long; lax; dilated.
278	Herniated cecum et appendix.	Long.	Obtuse.	Normal.	Obtuse.	Lax.	Two angles.	Very long; hernia.
279	Undescended; dilated.	Very short.	Obtuse.	Dilated.	Obtuse.	Normal.	Two angles.	Embryonic cecum; constipation.

No.	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Pelvic colon	Inference
280	Slightly dilated.	Short.	Obtuse.	Descends on left and ascends anterior to descending colon.	Obtuse.	Long; lax; narrow.	Fig. 8 form; dilated.	Long colon; lax gastrohepatic mesentery.
281	Pouched.	Short.	Obtuse.	High; dilated.	Not drawn.	Normal.	Two folds; sacculated.	Constipation.
282	Normal.	Normal.	Normal.	Oblique.	Acute.	Lax.	Normal.	Normal.
283	Normal.	Normal.	Normal.	Normal.	Normal.	Normal.	Tumor of sigmoid reaching process 16 × 12 cm.	Tumor of sigmoid.
284	Pouched; low; adhesions.	Short.	Adhesions.	Adherent mass.	Acute.	Coiled.	Straight.	Peritonitis.
285	Low in pelvis.	Dilated; short.	Acute.	Dilated; extends low into pelvis.	Normal.	Normal.	Normal.	Giantism of transverse colon.

A STUDY OF LIVER FUNCTION IN NORMAL PREGNANCY.*

BY

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On account of the importance which has been given to the liver in eclampsia and other toxemias of pregnancy, an investigation of the liver function in the various toxemias was undertaken; but before the work had gone far there was evidence of disturbed liver function in a surprisingly large number of, apparently, normal women, who presented a distinct problem with which this study will deal.

The Choice of a Functional Test.—One faces some difficulty in selecting a functional test from the many which have been advocated, because they all have their drawbacks and none of them are absolutely specific. The urobilinogen and urobilin test was selected because it is as nearly specific as any, and on account of its simplicity of application, it may be used in any clinical laboratory; it does not require the elaborate estimations of the physiological chemist and is, probably, as accurate as any of the more difficult methods. It consists of finding urobilinogen or urobilin in the urine. None of the other functional tests can be said to so certainly deal with functions which are specific to the liver as the urobilinogen test. The muscles play a large rôle in carbohydrate metabolism, and Van Slyke says the kidney possibly participates in the conversion of amino acids into urea. "The results of the tests seem to be inconsistent with the possible exception of the urobilinogen test which is positive in even mild diseases of the liver. It is the most positive of all tests for liver injury; the great difficulty with it, however, is in determining the amount of the injury by any satisfactory quantitative method."

Technical difficulties interfere with most of the tests; giving large amounts of carbohydrates leads to nausea, vomiting and diarrhea; considerable chemical training and equipment are necessary in determining nitrogenous metabolism while large quantities of blood are needed for the fibrinogen studies.

As far as is known the paradimethylaminobenzaldehyde test is specific, because to no other than liver cells has been ascribed the ability to convert urobilinogen into ordinary bile pigment, and Falk and Saxe concluded that urobilin is found in the urine when there is very slight injury to the liver. v. Jaksch, as long ago as 1892,

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averred that urobilinogen in the urine was an indication of liver disease. Urobilinogen does not occur in the urine in health except in very small quantities which are not found by the usual methods. Since Jaffe in 1868 described urobilin in the urine much discussion has taken place both as to its origin and its clinical significance. The most generally accepted view of the formation of urobilinogen and urobilin is that of Friedrich v. Müller which is supported by the known facts of hemoglobin metabolism. Addis in the Archives of Internal Medicine, March 15, 1915, gives us the most recent thought on this subject in his article on "Hemoglobin Metabolism." "Hemoglobin is produced and decomposed in the liver. Hemoglobin is liberated from the old red blood corpuscles into the blood plasma, is taken up by the Kuppfer cells from which droplets of hemoglobin have been seen to pass to liver cells. This liberation of hemoglobin from corpuscles is the first step in the process of hemoglobin pigment decomposition. Hemoglobin pigment is set free and converted into bilirubin in the liver.

"The bilirubin then passes into the intestines where it is converted by bacterial decomposition into urobilinogen, part of which may become urobilin, which is simply an oxidation product of urobilinogen; the two, from a physiological standpoint, may be considered as one. It is then absorbed and goes to the liver through the portal circulation and in the liver is again transformed into bilirubin, if the liver functionates normally. In inefficiency of the liver they pass into the general circulation and are found in the urine. Urobilin or urobilinogen does not occur in the urine in more than normal amount in complete obstruction of the common duct in stone and cancer. Müller gave bile by the stomach tube in a case of complete obstruction and immediately the urobilin action was positive. Also urobilinogen or urobilin are rarely found in the urine of the newborn before bacteria appear in the intestines. In marked diarrhea, when the bile is swept from the intestines too rapidly to permit the influence of the bacteria, urobilin is absent.

In Ecks artificial fistula and patent ductus venosus, in both of which the blood of the intestines goes directly into the general circulation, urobilinuria or urobilinogenuria occurs, because the liver has no opportunity to reconvert it. According to Wilbur and Addis, "Urobilinuria or urobilinogenuria is indicative of the fact that bile is reaching the intestine, and large amounts of urobilin or urobilinogen in the urine means there is either abnormal destruction of red blood cells or an insufficiency of the liver." Therefore, if we can exclude conditions in which there is increased blood destruction we, in all probability, have an inefficiency of the liver. This can usually

be done, clinically, with a fair degree of accuracy and, positively, by examining the duodenal contents. A large amount of urobilin or urobilinogen in the stools indicates increased blood destruction. For example: In decompensation with congestion of the liver the urobilin and the urobilinogen in the urine is increased more than in the duodenum, and just the opposite occurs in hemolysis.

Hegern says urobilin or urobilinogen in the urine always means liver inefficiency either: (1) *Absolute* which is due to pathological changes in the liver or (2) *Relative*, due to extraordinary quantities of blood pigment being brought to the liver as occurs in blood dyscrasias associated with marked destruction of red blood cells, thus exaggerating the normal function.

While not every case of urobilinuria, not due to blood destruction, can be attributed to disturbance of the liver function, yet that is usually the case.

According to v. Müller "Urobilinogenuria and Urobilinuria necessarily depend on pathological changes in the liver or increased blood destruction." Addis says "On the whole clinical evidence is strong that urobilinogenuria or urobilinuria is associated with liver disturbance if marked increase in hemoglobin disintegration can be excluded. When urobilinogen or urobilin appears in the urine, the whole liver is affected but, not as a rule, sufficient to disorganize any of its other functions to a recognizable extent." Various authors have found urobilinogen in diseases which interfere with the function of the liver. Münzer found it in atrophic cirrhosis and Fischler stated that a diagnosis of alcoholic cirrhosis was incorrect, unless urobilinogen was found in the urine; Münzer, Bloch and Fischer found it in acute catarrhal jaundice prior to the appearance of icterus. It is also found in acute diseases associated with liver involvement, *e.g.*, typhoid and pneumonia, and Bauer says it occurs in almost all liver diseases.

Technic.—It is not difficult to detect urobilinogen and urobilin qualitatively. The test for urobilinogen is made by adding four or five drops of Ehrlich's solution[1] to 5 c.c. of urine and leaving it in a dark place for at least fifteen minutes when, if positive, a distinct pink or deep red color will appear. To make sure that the red color is due to urobilinogen shake with chloroform; if urobilinogen is present the chloroform will become red. Indol and skatol are broken up by heat and give the same reaction as urobilinogen, so one must not use

[1] Ehrlich's Solution

Paradimethylamidobenzaldehyde	2 gm.
Hydrochloric acid (con.)	15 c.c.
Distilled water	15 c.c.

heat. To test for urobilin add 10 c.c. of Schlesinger's solution[1] to the same amount of urine and filter. If urobilin is present a green fluorescence will be seen which is best brought out by throwing condensed light through the fluid by a lense or flask of water. A successful method of absolute quantitative determination of these exceedingly labile substances has not yet been found. Connor and Roper, in 1908, made approximate measurements of the amount of urobilin in the urine by noting the number of dilutions required to obliterate the urobilin band in the spectroscope. This method, however, left the urobilinogen undetermined, because of the impossibility of converting all of it into urobilin without loss.

Wilbur and Addis conceived the idea of estimating the two together by the spectroscope method which, though not giving an exact quantitative determination, yields an approximate result of great clinical value. After adding Ehrlich's solution urobilinogen and urobilin each show an absorption band in the spectroscope; one between *D* and *E* and the other between *B* and *F*. They describe their method as follows: "The only way the quantity of urobilinogen can be determined, except gravimetrically, is by the spectroscope through the absorption bands of the pigment produced by its reaction with Ehrlich's solution. To 10 c.c. of urine is added an equal amount of Schlesinger's solution and filtered. This will contain all the urobilin and urobilinogen of the urine except a negligible amount absorbed in the precipitate.

To 10 c.c. of the filtrate is added 1 c.c of Ehrlich's solution, this gives enough acid to bring out the urobilin band more clearly and, at the same time, brings out the urobilinogen band so that the dilution values of both urobilin and urobilinogen can be estimated in the same filtrate. After adding Ehrlich's solution it is allowed to stand for fifteen minutes to allow the urobilinogen reaction to take place. The filtrate is then diluted with distilled water till the two absorption bands disappear, which will be at different dilutions. The time of disappearance of each is noted. The dilution required gives the value for 5 c.c. of urine; 10 c.c. having been taken only half of which was urine. If the dilution figure is multiplied by the number of 5 c.c. quantitatives in the twenty-four-hour urine, the number of dilutions which would have been necessary if all of the urobilin and urobilinogen of the twenty-four-hour specimen had been concentrated into 5 c.c.

I present herewith a table in which the essential features only of each case showing a positive reaction are given.

[1] Schlesinger's solution is a supersaturated solution of zinc acetate in absolute alcohol.

Case No.	Age	Para	Months gestation	Urobilinogen urobilin	Complications	Remarks
P3	32	IV	8	+	Patient listless.....	Ablatio placentæ. death.
6955	20	I	9	+ Trace	Systolic murmur over whole heart area, not transmitted, albuminuria, pus.	Delivered 7–20–15.
P4	28	II	8½	+		
6437	23	.....	9	+ Trace	.....	Delivered 4–15–15.
P5	....	.....	.....	+	.....	Not delivered.
6444	36	.....	9	+	Dental caries.....	Delivered 4–16–15.
6596	22	I	9	+	Hemoglobin 56 per cent., Wassermann +.	Delivered 5–16–15, R. B. C. 4,500,000.
6482	22	I	9	+	Mitral regurg., kidney of pregnancy, hemoglobin 76 per cent.	Compensation Wassermann+.
6571	24	I	.....	++		
6580	38	.....	.....	++		
6404	29	.....	9	+ Trace	Mitral regurg., aortic regurg., hypert., dil'n dental caries.	Delivered 4–19–15.
6540	20	I	9	+ Trace	Poorly nourished, chron. urticaria, hemoglobin 58 per cent., albumin trace, pus.	R. B. C. 700,000 Wassermann.
6923	32	IV	9	+	Dental caries mitral regurg. obesity, hemoglobin 80 per cent.	Delivered 7–15–15, Wassermann,— R. B. C. 4,000,000.
6285	....	.....	9	+	Dental caries.....	Wassermann— delivered 3–17–15.
6458	31	.....	.....	+	Mitral regurg.....	Compensation.
6318	18	I	.....	+ Trace	Hemoglobin 68 per cent...	Wassermann—.
6341	18	I	9	++	Dental caries.....	Wassermann— delivered 4–4–15.
6387	26	.....	9	+	Dental caries.....	B. P. 122, Wassermann—.
6414	31	.....	9	+	Hydramnios.....	Precipitate labor Wassermann+ 4–20–15.
6531	22	I	9	++	Albumin ft. trace.....	Wassermann—.
6267	26	.....	.....	+	Pyorrhea mitral regurg., pulse irreg., heart hypert. and dilated, hemoglobin 68 per cent.	Delivered 3–20–15, well compensated, Wassermann—.

Case No.	Age	Para	Months gestation	Urobilinogen urobilin	Complications	Remarks
6936	27	I	.....	+	Albuminuria, few hyaline and gran. casts.	Delivered 7–16–15.
6590	25	V	9	+	Pyelitis, hemoglobin, 69 per cent.	Delivered 7–31–15.
6570	21	III	9	++5–11–15, 0, 5–17–15	Hydramnios, pyorrhea, Wassermann+.	Delivered 5–23–15.
P6	32	II	8½	+		
6316	20	.....	.....	+	Dental caries, edema cervix, hemoglobin 50 per cent.	Wassermann.–
6276	34	.....	.....	+	Hydramnios, glycosuria, mitral regurg.	Wassermann,– compensation.
6979	41	X	9	+	Hemoglobin 60 per cent...	Delivered, 7–25–15, Wassermann.–
P7	30	II	8	+		
6992	28	IV	9	+	Hemoglobin 65 per cent., alb. v. ft. trace.	Delivered 7–27–15, Wassermann.
7077	25	I	8½	+	.....	Wassermann.–
6801	35	III	9	+	Ichthyosis.	Delivered 6–21–15, Wassermann.–
6845	36	VII	9	+	Mitral regurg., aortic regurg., obesity.	Delivered 6–29–15.
P8	26	I	8	+		
6855	30	III	9	++	.....	Wassermann, – delivered 7–1–15.
6688	34	IV	9	+	Hemoglobin 81 per cent., albumin trace.	Delivered 5–31–15.
P1	30	II	8	++	.....	Delivered 4–13–15.
6818	19	I	9	+	Mitral regurg., hemoglobin 72, albumin trace, 1 cast.	Compensation good, Wassermann,– del. 7–14–15.
6335	22	I	9	++	Hemoglobin 65, dental caries, gingivitis.	Delivered 3–29–15.
6446	17	I	9	++	Heart, all sounds accentuated, gonorrhea, hemoglobin 65 per cent.	Delivered 4–16–15, complete compensation.
6881	19	I	.....	.....	No history, patient in hospital but one day, albumin faint trace.	Did not return for delivery.

Case No.	Age	Para	Months gestation	Urobilinogen urobilin	Complications	Remarks
6550	23	I	8½	++5−7−15, 0−5−19−15	Colloid goiter, mitral regurg., hemoglobin 56.	B. P. 108–71, compensation, Wassermann. —
6515	29	II	6	+	Pulmon. tuberc., no T. B. found, hemoglobin 68 per cent., albumin ft. trace.	B. P. 138–68, W. B. C. 7200 not delivered in hospital.
6289	22	I	9	+	Dental caries, pyorrhea, mitral regurg., hemoglobin 62 per cent., albumin ft. trace, some pus in urine.	Compensation, slight dilatation Wassermann. —
P2	32	II	8½	+	Normal.....	
6332	34	.....	9	+	.....	Not delivered in hospital.
6382	23	.....	.....	+	Hemoglobin 68.....	Delivered 4–15–15.
P15	....	I	.....	+	Not examined.....	Left hospital.
6626	18	I	9	+	Dental caries, pyorrhea, colloid goiter, albumin ft. trace.	Hemoglobin 86 per cent., R. B. C. 4,300,000, not delivered in hospital.
6896	28	IV	9	++	Hemoglobin 77 per cent., albumin ft. trace.	Wassermann, — del. 7–16–15, sapremia.
6441	31	.....	9	+	Pyorrhea. hemoglobin 70 per cent.	Delivered 7–1–15, R. B. C. 4,100,000.
6891	22	II	9	+	Dental caries, alb. v. ft. trace.	Delivered 7–15–15, Wassermann. —
6972	21	I	9	+	Hemoglobin 58 per cent.	Delivered 7–23–15, sapremia, Wassermann. —
7120	18	I	9	+	Hemoglobin 74 per cent...	.....
7095	26	III	9	++	Alb. trace.....	Wassermann. —
7134	27	I	9	++	Mitral regurg.....	Compensation.
P9	40	III	7	+	None.....	
P10	32	II	6	+	None.....	
P11	28	V	6	+	Contracted pelvis.....	Never had living child.
P12	34	I	7	+	Hydramnios.....	Premature delivery.
P13	32	II	4	+	Headaches.....	B. P. 120.
P14	25	I	6	+	None.....	

SUMMARY.

Nonpregnant cases examined	71
Cases showing positive reaction	00
Per cent. positive reaction	00
Pregnant cases examined	200
Cases showing positive reaction	62
Per cent. positive reaction	31
Cases which might account for the reaction by other conditions than pregnancy	12
Net reactions probably due to pregnancy	50
Per cent. net reactions	25

This study is based upon the examination of the urine of 271 cases; 200 of which were women apparently normally pregnant and seventy-one were healthy nonpregnant women. It is hardly necessary to try to prove that urobilinogen or urobilin are not present in the urine of healthy individuals. This has been established by many observers after the examination of hundreds of cases and, it is accepted as a fact, that these substances do not occur in the urine in amounts which give a reaction with the ordinary methods, such as the one employed here. Nevertheless, the urine of seventy-one healthy women was examined and in no case was urobilinogen or urobilin found.

In the 200 cases of so-called normal pregnancy sixty-two gave the reaction for urobilinogen or urobilin. This gives us the surprising proportion of 31 per cent. Now, if we accept the statements of those who have studied these substances in other fields, that urobilinogen or urobilin in the urine means either increased blood destruction or inefficiency of the liver, we must come to the conclusion that, in the absence of blood dyscrasia, there must be interference with the function of the liver during pregnancy, and, on account of it, unless the woman has some disease which causes functional disturbance of the organ, such as congestion of the liver in cardiac decompensation.

In none of the cases was there evidence of blood dyscrasia, although some of the patients were quite anemic; however, simple anemia is not accompanied by urobilinuria, as is the case in the pernicious variety. There being no great destruction of blood we have only to deal with disturbed function of the liver; and if the patient has no complicating disease which alters the function of the liver we will be justified in coming to the conclusion that the inefficiency is due to the pregnancy itself.

In analyzing the cases, shown in the accompanying table, we find no complications which are known to be accompanied by reduced liver function except, possibly, eleven cases of valvular heart lesions

and one of infection of the urinary tract with high fever. In cardiac disease urobilinuria is not present unless there be decompensation. In none of these cases was there marked clinical evidence of decompensation; however, it is not always possible to know exactly when decompensation begins, so there might be beginning failure of the heart to do its whole work and a resulting congestion of the liver with altered function. There were two cases with slight dilatation as well as hypertrophy in which there would be even more likelihood of heart weakness.

On account of the possibility, if not probability, of these eleven cases of heart lesion being attended by a congested liver and resultant decreased function, perhaps we should exclude them as well as the one case of infection with high fever.

This would leave *fifty* cases in which the interference with the functions of the liver could be accounted for only by the pregnancy itself. This still leaves us 25 per cent. of disturbed liver function during pregnancy attributable to no other cause than the pregnant condition. Just why pregnancy should cause interference with the function of the liver, future investigation must tell us; however, it may not be out of place to suggest the possibilities: The first one that comes to mind is the congestion of the liver possibly caused by the enlarging uterus. This is favored by the fact that the urobilinuria occurs more often in the latter months of pregnancy, increasing in frequency as the end of term approaches. The earliest I have observed was in the fourth month, in which, of course, the size of the uterus was not responsible. If the liver is congested late in pregnancy, this theory is strongly supported by the well-established fact that the congestion of the liver and urobilinuria in cardiac decompensation increase or decrease, synchronously, as the compensation grows or fails. If on the other hand, the liver is always congested in late pregnancy, why do we not always find urobilinuria. We are yet in the realm of theory. The effect of toxins on the liver suggests the possibility of toxemia as a cause of the altered function.

While this series of 200 cases is small, they are enough to prove that urobilinogen and urobilin are found in the urine of pregnant women in a large percentage of cases and their presence is due, in all probability, to disturbed liver function. It also suggests that there may be a "liver of pregnancy" as well as a "kidney of pregnancy." In nine of the cases the quantity of urobilin and urobilinogen was estimated according to the Wilbur and Addis method of dilution to the point of disappearance of the absorption bands, of each substance, in the spectroscope.

Case No.	Amount of dilution	Number of dilutions	Dilution, value per liter
6531	60 c.c.	12	2400
6341	90 c.c.	18	3600
6458	60 c.c.	12	2400
6540	50 c.c.	10	2000
6444	85 c.c.	17	3400
P 5	25 c.c.	5	1000
6437	140 c.c.	28	5600
6446	30 c.c.	6	1200
P 1	50 c.c.	10	2000

CONCLUSIONS.

1. Urobilinogen and urobilin do not appear in the urine of healthy individuals except in quantities too small to detect by ordinary methods.

2. Urobilinogen or urobilin in the urine usually mean increased blood destruction or inefficiency of the liver, although there may be other causes.

3. Urobilinogenuria and urobilinuria occur in a large percentage of pregnant women; 31 per cent. in this series.

4. Excluding cases which might be due to other causes than pregnancy there are 25 per cent. distinctly attributable to pregnancy, suggesting the possibility of a "liver of pregnancy."

5. This is, probably, due to deficient liver function.

6. The causes are unknown, but it is probably due to congestion of the liver or toxemia.

I wish to acknowledge my indebtness to Drs. J. P. Schneider and W. C. Johnson of the University of Minnesota hospital for valuable help.

BIBLIOGRAPHY.

Wilbur and Addis. Urobilin: Its Clinical Significance. *Arch. of Internal Medicine*, vol. xiii, 1914, p. 281.

Connor and Raper. Bilirubin, Urobilin and Urobilinogen. *Arch. Int. Med.*, vol. ii, 532.

Falk and Saxe. Relation between Different Functional Liver Tests. *Zt. f. Klin. Med.*, lxxiii, 325.

Wilbur and Addis. Urobilin. *Jour. Amer. Med. Assoc.*, 1912, lx, 929.

Hofbauer. Zur Klärung des Begreffs Schwangerschaftsleber. *Arch. f. Gyn.*, 1911, Bd. xciii, 405; *Monatschr. f. Geb. u. Gyn.*, 1913, Bd. xxxviii.

Jaffe. Urobilin. *Virchow's Arch. f. path. anat.*, xivii, 405.

Addis. *Arch. of Int. Med.*, March, 1915.

Münzer and Bloch. *Arch. f. Verdauungskr.*, xvii, 260.

IN MEMORIAM.

WALTER BLACKBURN DORSETT, M. D., F. A. C. S., 1852–1915.

BY

FRANCIS REDER, M. D., F. A. C. S.

A YEAR ago, at the Buffalo meeting, I brought you greetings from a Fellow who was then a very sick man. To-day, I bring you the sad news of his death.

On July 27, at his home, in St. Louis, just as the morning light was breaking, Dr. Walter Blackburn Dorsett passed from the shores of activity to the realms of silence, borne by the mysterious tide that ebbs but never flows. A brave man, honest and generous, with strong intellect and absolute devotion to principle, he always endeavored to elevate his profession and constantly labored to advance its interests. Broadminded and singularly free from narrow prejudices, his strong personality inspired trust, confidence and love in his patients. His frequent acts of kindness to the poor, would, if known, have won him the admiration of all.

Dr. Dorsett attained the age of sixty-three. This placed him in the ranks of the "old practitioners." He possessed a charming individuality, garlanded by a combination of modern push and old-fashioned courtesy; it was this which made him a delightfully conspicuous figure at all gatherings. As a teacher, he possessed that rare ability of being able to awaken the keenest interest in his students for the subject he sought to elucidate.

The younger members of the profession always entertained a filial modesty, most respectful for the man and his professional attainments; while the older members unselfishly shared the trials, the disappointments, and the pleasures of the mission he so earnestly strove to fulfill.

In his affiliations with the numerous medical societies, Dr. Dorsett always showed the liveliest interests. The presentation of a paper—and his contributions were many—was always a most worthy,

WALTER BLACKBURN DORSETT, M.D., F.A.C.S.

BORN JUNE 13, 1852. DIED JULY 27, 1915.

scholarly effort. In his extemporaneous discussions of professional subjects, he impressed the listener with his capacity for labor and the wide range of his knowledge and interest.

As an operator, Dr. Dorsett possessed a masterful technic. His operations upon the organs and structures of the genital zone were ideal in their execution. As an accoucheur, he ranked among the most able. His eagerness to acquire new knowledge and his persistent enthusiasm, even when burdened by the weight of his illness, were inexhaustible.

Dr. Dorsett was born in St. Louis County, Missouri, June 13, 1852. He was the son of Henry L. Dorsett, born in Louden County, Virginia, and Georgia Ann Dorsett, nee Blackburn, born in Versailles, Kentucky. His first college course was in civil engineering at the Washington University. Later, he took up the study of medicine at the old St. Louis Medical College, now the Medical Department of Washington University. March 4, 1878, he graduated with the degree of M. D. For a year he served as an interne in the St. Louis City Hospital. In the summer of 1879, during the epidemic of yellow fever, he was made Superintendent of the St. Louis Quarantine Hospital.

Dr. Dorsett married Miss Eleanor C. French, at Olney, Illinois, in 1880. One son was born, who is now a practising physician in St. Louis. From 1880 till 1887 he was Chief Dispensary Physician, and from 1887 to 1892, was Superintendent of the St. Louis Female Hospital. He was a Fellow of the American Medical Association and Chairman of the Section on Obstetrics and Diseases of Women in 1908; he was a member of the House of Delegates at seven annual sessions. He has been president of the St. Louis Medical Society, Missouri State Medical Association, St. Louis Obstetrical and Gynecological Society and the American Association of Obstetricians and Gynecologists. Dr. Dorsett was a member of the Medical Society of St. Louis City Hospital Alumni; of the St. Louis Surgical Society; of the St. Louis Medical History Club; of the Surgeons Club of St. Louis; of the St. Louis Academy of Science; of the American Association of Railway Surgeons; of the Western Surgical Society; of the Southern Surgical and Gynecological Society, and of the Medical Association of the Southwest. He was also delegate from the State of Missouri to the International Congress of Tuberculosis.

Dr. Dorsett's hospital service included the positions of attending gynecologist to the Missouri Baptist Sanitarium, and the Evangelical Deaconess Home and Hospital. He was consulting gynecologist

to St. Mary's Infirmary, the Rebekah Hospital, and the Alta Vista Hospital, at DeSoto, Missouri. He had been for many years Professor of Gynecology and Pelvic Surgery in the St. Louis University School of Medicine.

During the last year of his illness—a chronic interstitial nephritis engendering a most exhausting angina—Dr. Dorsett suffered much. The ailment which so strongly taxed his fortitude denied him the comforts of his bed, and he was compelled to assume, for the greater part of the time, a sitting posture in a chair. He realized as the days went on that the shadows were deepening. He felt that the morning—with its hopes, and the noontide—with its labors, were gone, and that the sunset, and the gathering gloom, and the pensive memories of by-gone days were all that remained.

Like passing birds that light upon the trees in autumn to sing their songs among the sere and falling leaves, and then fly away, all earthly hope soon vanished, and Dr. Walter Blackburn Dorsett passed "unto the kingdom of perpetual night."

INDEX.

Abrams, Edward Thomas, xxxiii
Anemia, splenic, with splenectomy, 342
Anesthesia in gynecological operations, 247
Anesthesia, local, further experiences with, in herniotomy, 16
Appendix, the surgery of the, 55
Atypical chorioepithelioma, 161

Bacon, Joseph Barnes, xxxiii
Bainbrigde, William Seaman, xxxiii, 273
Baldwin, James Fairchild, xxxiii
Bandler, Samuel Wyllis, xxxiii, 190, 202, 256
Barrett, Channing W., xxxiii
Baughman, Greer, xxxiv, 180, 270
Bell, John Norval, xxxiv, 33, 151, 157
Bill, Arthur Holbrook, xxxiv, 152
Bladder and uterus, transposition of the, 315
Blood transfusion, direct, use of sodium citrate for, 91
Bonifield, Charles Lybrand, xxxiv, 1, 84, 94, 177, 183, 258
Bosher, Lewis C., xxxiv
Boyd, James Peter, xxxiv
Branham, Joseph H., xxxv
Brown, George Van Amber, xxxv, 256, 262, 271
Brown, John Young, xxxv
Brown, William Mortimer, xxxv, 308
Buteau, Samuel H., xxxv

Carstens, J. Henry, xxxv, 30, 85, 88, 89, 140, 152, 183, 200
Chandler, George, xxxv
Cholecystectomy versus cholecystotomy, 36
Chorioepithelioma, atypical, 161
Chronic intestinal stasis, 273
Clark, Edmund Dougan, xxxv, 342
Colloidal silver in sepsis, 262
Colons, morphography of, 348
Congdon, Charles Ellsworth, xxxvi
Crile, George W., xxxvi, 95, 124
Crotti, Andre, xxxvi
Crossen, Harry Sturgeon, xxxvi
Cystocele and descensus uteri, cure of, 315

Darnall, William Edgar, xxxvi, 34, 81, 84, 87
Davis, Asa Barnes, xxxvi, 151, 159

Davis, James Ethelbert, xxxvi, 69, 259, 348
Davis, John D. S., xxxvi
Deaver, John Blair, xxxvii
Dice, William Gordon, xxxvii
Dickinson, Gordon K., xxxvii, 30, 54, 61, 112, 125, 142, 151, 181
Dorsett, Walter Blackburn, in memoriam, 402
Dressings, wound, 324

Eastman, Thomas Barker, xxxvii
Eclampsia and its treatment, 308
Elbrecht, Oscar H., xxxvii, 123, 124, 141, 200, 244, 254
Erdmann, John Frederick, xxxvii, 31, 40, 54

Fibroid tumor completely obstructing uterine canal, 165
Findley, Palmer, xxxvii, 187, 190
Fistulæ, postoperative uteral, some observations upon, 70
Foster, Curtis Smiley, xxxvii, 41
Frank, Louis, xxxviii
Freeland, James Roy, xxxviii
Furniss, Henry Dawson, xxxviii, 70, 80

Gall-stone causing intestinal obstruction and volvulus, 24
Gas-pains, 112
Gillette, William, J., xxxviii
Gilliam, E. Tod, 33, 140, 245
Goldspohn, Albert, xxxviii
Goodman, Sylvester Jacob, xxxviii, 213
Gray, Frank D., xxxviii, 29, 62, 121
Gynecologic and obstetric practice, some comments on present tendencies in, 1
Gynecological operations, anesthesia in, 247
Gynecology, minor surgical, 330
Gynecology, the principles of, 238

Hadden, David, xxxix
Haggard, William David, xxxix
Hall, Joseph Arda, xxxix
Hall, Rufus Bartlett, xxxix, 24, 29, 34, 63, 88, 151, 243, 244, 246, 259, 260, 261
Hamilton, Charles Sumner, xxxix
Harrar, James Aitken, xxxix
Hayd, Herman Emil, xxxix, 31, 53
Hedges, Ellis W., xl
Hernæ, inguinal, unusual contents of, 44
Herniotomy, further experiences with local anesthesia in, 16
Hill, Isadore Leon, xl
Howitt, Henry, xl
Huggins, Raleigh Russell, xl, 213, 247, 260, 261
Humiston, William Henry, xl, 22, 64, 88

Ill, Charles L., xl, 33
Ill, Edward Joseph, xl
Inguinal herniæ, unusual contents of, 44

Intestinal obstruction and volvulus, gall-stone causing, 24
Intestinal stasis, chronic, 273
Intestinal stasis, chronic, conservative surgery of, 98
Intestinal stasis, newer conceptions of, 95

Jacobson, Julius H., xli, 16, 22, 69, 94
Jenks, Nathan, xli
Jonas, Ernst, xli
Jones, Arthur Thomas, xli, 63, 140

Kahn, Max, 93
Keefe, John William, xli, 20, 41, 55, 64
Kennedy James W., xli
King, James E., xli, 182
Kirchner, Walter, C. G., xlii

Langfitt, William Sterling, xlii
Leighton, Jr., Adam P., xlii, 124, 142, 151
Litzenberg, Jennings, xlii, 392
Liver function in normal pregnancy, 392
Lobenstine, Ralph Waldo, xlii
Longyear, Howard Williams, xlii
Lothrop, Earl P., xlii
Lott, Henry Stokes, xlii, 154, 238, 246
Luteum extract in the treatment of menstrual disorders, 134
Lynch, Jerome Morley, xliii

McClellan, Benjamin Bush, xliii, 161
McMurtry, Lewis Samuel, xliii
McPherson, Ross, xliii
Malignancy of the uterus, observations on, 127
Manton, Walter Porter, xliii
Marvel, Emery, xliv
Meeker, Harold Denman, xliv, 98, 125
Mesenteric thromboses, 81
Menstrual disorders, luteum extract in the treatment of, 134
Menstrual disorders, remove the uterus instead of the ovaries for, 85
Menstrual statistics, 218
Miller, Aaron Benjamin, xliv
Miller, John D., xliv
Minor surgical gynecology, 330
Moots, Charles W., xliv, 44
Moriarta, Douglas C., xliv
Morphography of two hundred and eighty-five colons, 348
Morris, Lewis Coleman, xliv
Morris, Robert Tuttle, xliv
Murphy, John Benjamin, xliv
Myofibroma complicating pregnancy, unusual case of, 157

Noble, George Henry, xlv
Noble, Thomas Benjamin, xlv

Obstetrics and gynecology, value of pituitary extract in, 202
Obstetrics, the teaching of, 170
Olmsted, Ingersoll, xlv

Pantzer, Hugo Otto, xlv, 29, 60, 65, 89, 120, 125, 142, 201, 254, 260
Peritonitis, acute suppurative, a prognostic sign in, 60
Pfaff, Orange G., xlv, 142, 151, 165
Pituitary extract in obstetrics and gynecology, 202
Porter, Miles F., xlv
Potter, Irving White, xlv
Poucher, John Wilson, xlvi, 122
Pregnant state, surgical operations during the, 191
Pregnancy and sterilization, combined operation for the interruption of, 187
Pregnancy, myofibroma complicating, 157
Pregnancy, normal, a study of liver function in, 392
Principles of gynecology, 238

Reder, Francis, xlvi, 30, 42, 54, 79, 158, 160, 191, 201, 402
Reed, Charles Alfred Lee, xlvi
Rongy, Abraham Jacob, xlvi, 89, 144, 155, 158, 160
Rosenthal, Maurice I., xlvi
Runyan, Joseph Phineas, xlvi
Ruth, Charles Edward, xlvi, 330

Sadlier, James Edgar, xlvi
Sanes, K. Isadore, xlvi, 80, 218, 246
Schildecker, Charles Bushfield, xlvii, 91, 94
Schwarz, Henry, xlvii, 148, 177, 199, 214, 270
Scott, N. Stone, xlvii
Sellman, William Alfred Belt, xlvii
Sepsis, colloidal silver in, 262
Sherrill, Joseph Garland, xlvii
Sigmoid, rare congenital abnormality of the, 66
Silver, colloidal, in sepsis, 262
Simpson, Frank Farrow, xlvii
Skeel, Arthur Julius, xlvii
Skeel, Roland Edward, xlvii
Smead, Lewis Frederic, xlviii, 315
Smith, Charles North, xlviii
Smith, Lewis Watson, xlviii
Smith, William S., xlviii
Sodium citrate, use of, for direct blood transfusion, 91
Splenectomy, splenic anemia with, 342
Splenic anemia with splenectomy, 342
Stark, Sigmar, xlviii
Stasis, chronic intestinal, 273
Sterilization, interruption of, 187
Stewart, Douglas Hunt, xlviii, 324
Stillwagen, Charles A., xlviii
Strasser, August Adrian, xlviii
Suppurative peritonitis, acute, a prognostic sign in, 60

Surgery of the appendix, 55
Surgical gynecology, minor, 330
Surgical operations during the pregnant state, 191
Sutcliffe, John Asbury, xlviii
Swope, Lorenzo W., xlviii, 36, 42

Tate, Magnus Alfred, xlix, 30
Teaching of obstetrics, 170
Thromboses, mesenteric, 81
Torrance, Gaston, xlix
Transposition of the bladder and uterus, 315
Tumor, fibroid, completely obstructing uterine canal, 165
Twilight sleep in obstetrics, the present status of, 144

Ureteral fistulæ, postoperative, some observations upon, 70
Uterus, observations on malignancy of the, 127

Vander Veer, Albert, xlix, 20, 31
Vander Veer, Edgar Albert, xlix
Van Sweringen, Budd, xlix, 66
Volvulus and intestinal obstruction, gall-stone causing, 24

Wade, Henry Albert, xlix
Waldo, Ralph, xlix
Walker, Edwin, l
Weiss, Edward Aloysius, l
Welton, Thurston Scott, l
Werder, Xavier Oswald, l, 127
West, James Nephew, l
Westmoreland, Willis Foreman, l
White, George R., l
Wound dressings, 324

Yates, H. Wellington, l

Ziegler, Charles Edward, li, 170, 185, 213
Zinke, Ernst Gustav, li, 154, 260